THE MARINE REVIEW

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SHIPPING WORLD YEAR BOOK.

The Shipping World Year Book, edited by Major Jones and published at Effingham House, Arundel street, Strand, London, W. C., England, has just reached this country. This is the twenty-second edition of this work. While it has always been a considerable book, every year finds important additions to it. The additions in the 1908 issue embrace digests of the Merchant Shipping Acts and of the Workmen's Compensation Act; new board of trade rules governing load line tables, freeboard for sailing ships, new scale of fees for load line survey, first aid, signaling and rating under the act of 1906. The Suez canal amendments for admission of deeper ships are also given. The new tariffs embrace those of Australia, Canada and New Zealand, as well as the modifications of the tariffs of other nations. The year book contains a complete port and harbor directory of the British Isles and a directory of all the commercial ports of the world. The new map for 1908 shows in distinguishing colors the routes of steamers and railways throughout the world with the eastbound and westbound lanes across the Atlantic. The book contains a great variety of interesting information too numerous to catalog. The price of the book is $1.75 delivered in the United States. Major Jones publishes his usual retrospective view, which is always interesting. He says:

"The year 1907 has seen the completion of the turbine Cunard liners Lusitania and Mauretania, and these vessels have won back for this country the blue ribband of the Atlantic, the Lusitania making the westward voyage in 4 days 18 hours and 40 minutes; and the Mauretania covering the eastward distance in 4 days, 18 hours and 29 minutes. Their running created enormous public interest. What the results are regarding coal consumption we cannot say, it is still too soon to determine with scientific accuracy; and although the turbine development has come to stay for other classes of vessel, notably in the Royal navy and for cross-channel steamers, there is considerable doubt as to whether the turbine can be made sufficiently economical for the ordinary liner and the cargo-carrying merchant steamer. The line of development will probably be in a combination of reciprocating engines and turbines, the former to deal with the high pressure part of the expansion, and the latter the low pressure part, thus covering a greatly increased total range of expansion. For ordinary commercial purposes the race between the turbine and the piston engine will be won or lost on the coal bill. The consumption with quadruple-expansion engines has been brought down to about 1.3 lbs. per I. H. P. per hour for all purposes; the substitution of turbines for reciprocating engines in ocean vessels depends chiefly upon whether the consumption with turbines can also be brought to this low figure. Dr. Elgar, E. R. S., a high authority, is of the opinion that there is of present most satisfactory evidence that this is yet practicable. The new turbine destroyers of a nominal 33 knots have been tried, some of them with marvelous results. The Mohawk, by Messrs. White, of Cowes, obtained 34½ knots, and the Tartar, by Messrs. Thornycroft, obtained 35.678 knots. In these vessels oil fuel only is employed. The machinery in all the vessels of the class is interchangeable.

The cargo-carrying merchant steamer has developed along the lines of giving small registered tonnage with large cargo capacity, provision of large compartments for carrying water ballast, and elimination of hold obstructions with the provision of very large hatchways. Water ballast is now frequently carried in triangular tanks beneath upper or main deck, and this water carried high up prevents the vessel being excessively stiff, when "light." When the vessel is loaded the tank occupies space that is of little value for cargo; and, indeed, for many cargoes, the sloping bottom of the tank helps the "self trimming." An important development in the construction of merchant vessels has taken place in the commencement of the building of a vessel on Mr. Isherwood's system of longitudinal construction. This system claims to considerably increase strength with a saving of weight and cost, and has the approval of all the registration societies. Those interested in the subject are advised to consult the Shipping World of April 17, 1907.

"The gas engine for marine propulsion has come in for much discussion in 1907, and an ambitious design was submitted by Mr. McKechnie, of Messrs. Vickers Sons & Maxim, Ltd., for a 16,000-H. P. battleship driven by gas engines using producer gas. There are serious difficulties which the gas engine for marine purposes has not yet overcome, and the day of the gas engine for over-sea traffic is not yet; but there are those who believe that day will come before many years are past. Solution of the many difficult problems that arise will be found with many minds on the search. For very large powers the metallurgist has to come to the aid of the engineer to overcome the difficulties of producing large cylinders which will stand the high impulses and the great and rapid variations of temperature that occur with internal combustion.

"The advantages of the oil motor for small work are so great, and its reliability has been demonstrated so thor-

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oughly, that there is growing up a very large trade for this work for pleasure launches, and for the self-propelled barges which can so cheaply do the transporting on the canals throughout the country. It is to the latter class of work that manufacturers will look for most of their customers, as the launch is only the luxury of the few, and can never reach the vogue of the motor car. It is interesting to note that several navy engineers who have been specially engaged in oil fuel and motor work have left the service for appointments with outside firms.

"It is interesting to record the number and tonnage of merchant ships of all nationalities having a speed of 21 knots and upwards. The total number is 58; the aggregate tonnage 345,741 tons. Each of the ship owning nations claims as follows from the foregoing totals: Britain, 38 ships of 186,511 tons; Belgium, 7 ships of 9,638 tons; France, 6 ships of 41,155 tons; Germany, 5 ships of 85,119 tons; America, 2 ships of 23,258 tons. There is not at present on the stocks of the world's yards any merchant vessels intended to challenge the premiership in speed of the Lusitania and Mauretania."

INLAND WATERWAYS COMMISSION.

Following are the recommendations of the Inland Waterways Commission as submitted to congress.

A. We recommend that hereafter plans for the improvement of navigation in inland waterways, or for any use of these waterways in connection with interstate commerce, shall take account of the purification of the waters, the development of power, the control of floods, the reclamation of lands by irrigation and drainage, and all other uses of the waters or benefits to be derived from their control.

B. We recommend that hereafter both local and general benefits to the people shall be fully considered in any such plans for the improvement of navigation in inland waterways, or for any use of these waterways in connection with interstate commerce; and that wherever practicable federal agencies shall co-operate with states, municipalities, communities, corporations, and individuals with a view to an equitable distribution of costs and benefits.

C. We recommend that hereafter any plans for the navigation or other use of inland waterways in connection with interstate commerce shall take full account of transfer facilities and sites, and of the location of tracks, grades, bridges, dams, depots, and other works of navigable and source streams with a view to equitable co-operation between waterway and railway facilities for the promotion of commerce and the benefit of the people.

D. We recommend that any plans for improving the inland waterways shall take account of the present and prospective relation of rail lines to such waterways, and shall ascertain so far as may be whether such waterways when improved will be effectively used in the face of railway competition; and that the relations between railways and waterways be further examined with the purpose of devising means of rendering the two systems complementary and harmonious and making such fair division of traffic that rates and management may be co-ordinated economically and with benefit to the country.

E. We recommend the adoption of means for ascertaining regularly all facts related to traffic on the inland waterways, and for publishing the same in a form suitable for general use.

F. We recommend the adoption of means for ascertaining and rendering available, at such rate as to meet public necessities, all requisite data related to the physical character and general utility of the navigable and any plans for the use of inland water-source streams of the country.

G. We recommend that hereafter ways in connection with interstate commerce shall regard the streams of the country as an asset of the people, shall take full account of the conservation of all resources connected with running waters, and shall look to the protection of these resources from monopoly and to their administration in the interests of the people.

H. We recommend that the congress be asked to make suitable provision for improving the inland waterways of the United States at a rate commensurate with the needs of the people as determined by competent authority; and we suggest that such provision meet these requisites, viz.: expert framing of a definite policy: certainty of continuity and co-ordination of plan and work; expert initiative in the choice of projects and the succession of works; freedom in selection of projects in accordance with terms of co-operation; and the widest opportunity for applying modern business methods.

I. We recommend that the congress be asked to authorize the co-ordination and proper development of existing public services connected with waterways; and we suggest that such enactment might provide that the president of the United States be authorized, with the advice and consent of the senate, to appoint and organize a national waterways commission to bring into co-ordination the corps of engineers of the army, the bureau of soils, the forest service, the bureau of corporations, the reclamation service, and other branches of the public service insofar as their work relates to inland waterways, and that he be authorized to make such details and require such duties from these branches of the public service in connection with navigable and source streams as are not inconsistent with law; the said commission to continue the investigation of all questions relating to the development and improvement and utilization of the inland waterways of the country and the conservation of its natural resources related thereto, and to consider and co-ordinate therewith all matters of irrigation, swamp and overflow land reclamation, clarification and purification of streams, prevention of soil waste, utilization of water power, preservation and extension of forests, regulation of flow and control of floods, transfer facilities and sites and the regulation and control thereof, and the relations between waterways and railways; and that the commission be empowered to frame and recommend plans for developing the waterways and utilizing the waters, and as authorized by congress to carry out the same, through established agencies when such are available, in co-operation with states, municipalities, communities, corporations, and individuals, in such manner as to secure an equitable distribution of costs and benefits.

An idea of the publicity that is given to an event of international importance may be obtained from a volume of clippings from American newspapers and periodicals that has been compiled by the advertising agency of Albert Frank & Co., of Boston, Mass., for the Cunard Steamship Co., Ltd., in connection with the advent of the Lusitania in the North Atlantic passenger fleet. The volume is doubtless one of the largest books of its kind ever compiled, as it contains nearly 10,000 clippings, arranged upon 700 pages 16 x 16½ in. The book is 5½ in. thick and is handsomely bound in full, crushed, red Turkey morocco, with various nautical emblems worked in gold upon both the outside and the inside of the covers.

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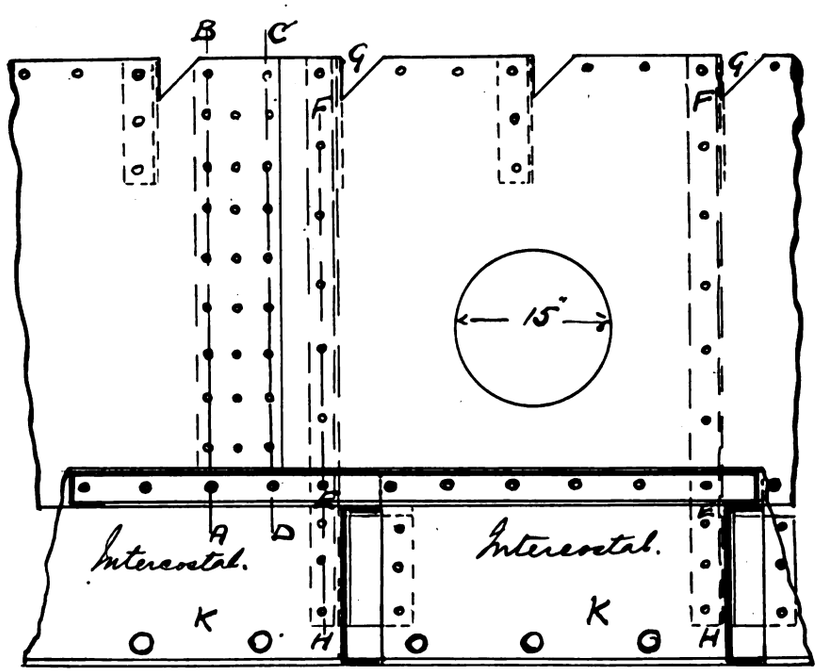
LAKE SHIP YARD METHODS OF STEEL SHIP CONSTRUCTION.

BY ROBERT. CURR.

The longitudinal plate is continuous and will now be considered as one girder, the connections at the lapped butts being governed by the rivet holes for the girder stiffener and notch for tank top stiffener, which is continuous from the center keelson to the ship's side.



— FIG. 15. —

E F Fig. 15 shows six rivet holes and the notch G measures 4 in., which is equal to 13/16 × 6 + 4″ = 8.887 in.

The girder plate is 43″ wide x ⅜″ thick so that 43″ less 8.87 = 34.13 in. left after punching.

34.13″ × ⅜″ = 12.79 sq. in. area of the girder plate through line E F and G.

12.79 × 26 = 332.54 tons tensile strength.

$$\frac{332.54}{12} = 27.71$$ rivets ¾″ diameter.

43″—3″ = 41 between top and bottom rivet centers 41/9 = 4.55 pitch of rivets.

The outer rows have 10 rivets each and the middle row 8, making a total of 28 rivets ¾″ diameter.

The area of the plate through A B and C D must correspond to E F and G. in this case it is less.

Example: 13/16″ × 10 = 8.12 in.

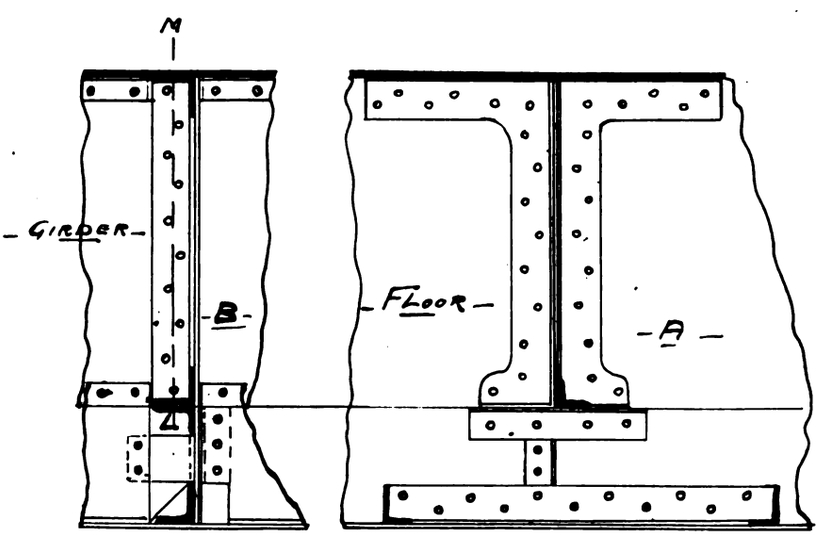
The plate through A B and C D has 34.88 in., equal to 340 08 tons tensile strength, and the 28 rivets fastening butt amounts to 336 tons shearing strength.

The unavoidable weakest section E F and G amounts to 332.54 tons tensile strength.

Nothing could be more satisfactory than this lapped butt connection.

The intercostal K in this case is of very little value under tension, the three (3) rivets H E being the only consideration equal to 36 tons shearing strain.

Fig. 16 shows the girder connection at the watertight floor plate in the tank, A is the floor plate and B the girder.



— FIG. 16. —

Collars shown on the floor plate are merely of a watertight nature but on the girder the line of holes through L M is of considerable importance.

There are 10 rivets in the collar L M, which are the same as through A B, Fig. 15, and equal to the line of holes E F and notch G for the girder stiffener.

These examples all agreeing leaves nothing to discuss, as the unavoidable weakest part is fixed at a tensile strain of 332.54 tons.

The arranging of a suitable number of manholes is the next consideration.

This vessel has four girders on each side and it is necessary to have at least three manholes in each girder so that a passage my be made to get from the center to the bilge of the ship.

E F and G, Fig. 15, has to be taken into consideration and as there is a reduction of material equal to 8.87 in. for each girder a hole may be cut 8.87 × 4 = 35.48 in. deep. The length is not of much importance in this case.

This example shows that the first and third or the second and fourth girders may have manholes in the same space and yet do not harm or injure the strength of the ship.

The manholes are seldom to be found in the same space, even if a girder not disturbed passes between.

It is usual to have at least two frame spaces between the manholes in each girder on each side of the vessel.

The example is shown for one side of the vessel only so that in the same

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girders the manholes are, as a rule, cut out in the same space.

Fig 17 shows sketch of the side stringer arrangement. A is a 12-in.

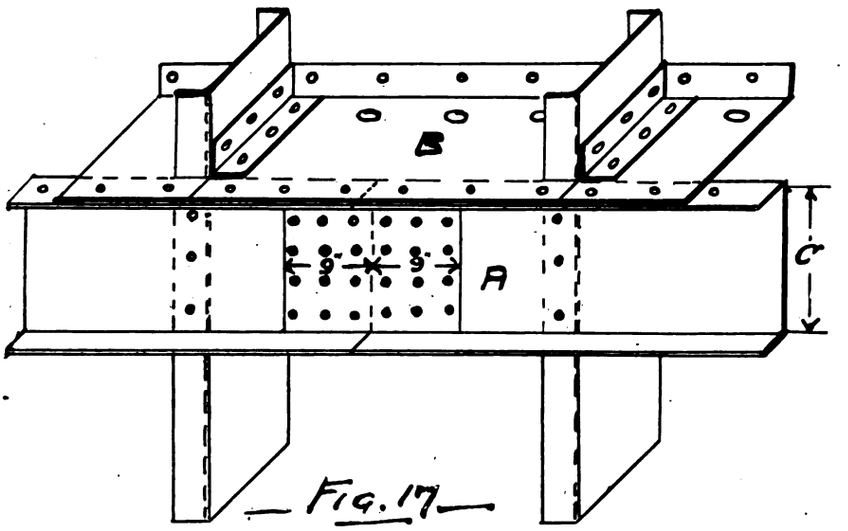

Fig. 17

channel fastened to the frame with three ¾"-in. diameter rivets and twelve (12) of the same diameter rivets at each side of the butt with a single butt strap.

This is the same consideration as the connection of the two channels together only this is a butt strap ar-

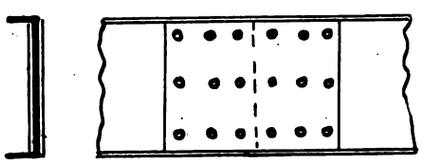

Fig. 18

rangement instead of an overlap which could not be carried out in this case satisfactorily.

A double strap is the best arrangement for butt strapping of the side stringer channel, because nine rivets a side or 18 in the butt is sufficient and it makes a neater butt connection, Fig. 18.

The intercostal B is of more importance here than at the girders in the tank because two clips are fitted connecting the intercostal to the frame, adding double shear to the rivets.

The butt strap A, Fig. 16, only fits between the two flanges of the channel, in which case the strap must be made thicker than the channel web to make up for the flanges.

The channel flattened out would measure 16 in. x 7/16, equal to 16 x 7/16 = 7 in.

The space between the flanges C measures 11 in. 11 in. × 11-16 in. = 7.56 in., area of butt strap.

The punching of the butt strap being the same as the channel no arguments are left.

If a double strap be fitted then two

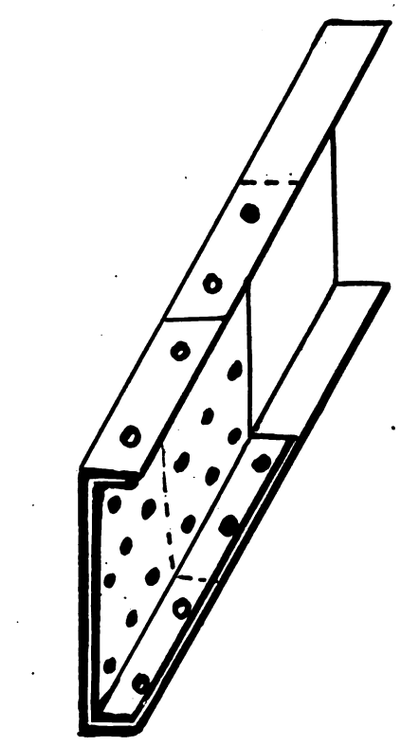

Fig. 19

pieces, 18 in. x 11 in. x ⅜ in., will form the butt connection with 9 rivets instead of 12, as shown at A, Fig. 16.

Should the butt strap be formed channel shape to fit inside of the channel then the rivets would be arranged for less in the web and the others in the flange, Fig. 19.

Sometimes it is necessary to put more rivets than required in a butt so that the material may be closed together properly.

When the unavoidable weakest section is kept in view no damage is likely to occur. It is necessary to have the spacing of rivets and the distance apart between rows of rivets in butts and laps in mind when making joint connections.

The spacing, etc., is shown in previous articles now in book form.

Investigations show that the rows of rivets in a butt connection should not be closer than two diameters of the rivet hole.

Channel and angle butt straps exceed that as a rule.

A, Fig. 16, shows a strap 18 in. wide when a strap 15 in. might be ample.

Lapped butts are sometimes arranged according to circumstances. It is not unusual to make a lap large enough to cover two or three rivets in a seam or continuous angle whichever the lap may fit on. There is no discussion on the rows being over two diameters apart.

According to this argument a zig-zag arrangement of rivets does not assist in the resisting of tension if the rows of rivets are closer to each other than two diameters of the rivet hole.

The arrangement of zig-zag riveting at the watertight floors does not matter seeing that the spacing beween the rows of rivets are less than two diameters.

In the case of the center keelson and girders the benefit of the doubt is given, but as these two cases are considered the weakest sections there is no argument left in case a demand be made to double the plating in that vicinity and increase the width of butt laps on the center keelson.

On the great lakes it is seldom that one comes across plates or shapes with too little landing. On plating, which is countersunk, the landing always extends over the countersink not less than the diameter of the rivet hole. The width of laps run, as a rule, for single riveting in width of 3½ times the diameter of the rivet hole and double size with the others of the same proportion.

The proposals received from Maj. Edward Burr for removing wreck of the steamship City of Birmingham from Boston harbor were: Boston Towboat Co., Boston, Mass., the government to pay the bidder $30,000; Boston Commission Merchants Co., Boston, the bidder to pay the government $100. Both proposals were rejected.

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MARE ISLAND AS A WORKSHOP

Editor MARINE REVIEW:—A great many eastern merchants have been attracted to Mare Island, Cal., by promises of terms of employment, and a number of those who left good positions and steady work in the different ship yards along the Atlantic seaboard for Mare Island have been ousted after a short term of employment despite promises of plenty of work.

On Dec. 5, 1907, in the construction and repair department 54 men were given their discharge. Lack of work caused by the completion of the Sheridan's repairs, in the drilling, riveting and chipping line, was given as an excuse. Some of those so discharged were old time mechanics who lived in Vellejo, but many were eastern mechanics attracted to the Pacific coast by advertisements inserted in eastern papers, promising two years' steady employment in the building of a collier. Several of the men when discharged had been employed but a short time and were stranded after their long and expensive trip across the continent.

As to the question of wages I am informed that under the existing circumstances wages do not compare favorably with those paid in the various eastern ship yards. It is a serious question for consideration when one understands that it costs a great deal more to exist either at Vallejo or San Francisco than it does in any of our eastern cities. A plate planer, a thoroughly competent workman in his line, who had been employed in an eastern ship yard, received at Mare Island Navy yard 19 cents per day less than he was receiving in the east. Living is costing this man $2.50 per week more in California, and he is receiving $1.14 per week less for his services. It may be interesting to note in this connection that the plate planer in question went to Mare Island understanding he was to be given piece work, but it was not forthcoming.

Vallejo, where most of the navy yard employes live, is a city of Solano county, about 15 miles from San Francisco, and in 1900 the population was 7,965.

At the Mare Island navy yard the number of workmen, foremen and quartermen-in-charge, employed during the fiscal year 1907 was 13. The number of men employed during the fiscal year was 848; the minimum number, 605; the average number of men employed 697.

The only vessel under construction there at the present time is the fleet collier U. S. S. Prometheus, which is of the following dimension: Length overall 465 feet 9 inches; beam molded 60 feet; depth molded 36 feet 6 inches.

A part which is generally overlooked when comparing yards on the Pacific coast with east coast yards is the amount of time which the workmen lose in the west coast yards on account of the rain which comes during the entire year, and especially during the rainy season which is during the winter months. During this time it is impossible to work out of doors and as for teaming, especially heavy teaming, the roads are almost impassable. Those who have not had experience in teaming work on the Pacific coast during the rainy season cannot realize the enormous expense of such transportation and the difficulties encountered. It is a common occurrence to see a team with a comparatively light load sunk up to the hubs of the wheels in mire.

In conclusion it may be of interest to note that during the last six months many letters have been received from those who went to the Pacific slope, in which regrets have been expressed for having made the venture. Times have been so hard there that charitable associations are unable to cope with the situation, and soup houses have been established by the Salvation Army to help keep people from starving. It is a common sight to see women, children and able bodied men lined up at the rear of hotels and eating houses waiting for the left-over food to be thrown out. Conditions in San Francisco and its immediate vicinity have quite reversed themselves since the earthquake. Before this great catastrophe occurred there were about three positions to each available man while today there are undoubtedly three men to every available position.

GEORGE H. CORLISS.

Quincy, Mass., March 12.

WOOD PRESERVATION.

It is estimated that 150,000 acres are required each year to grow timber for the anthracite coal mines alone. The average life of an untreated mine prop is not more than three years. By proper preservative treatment it can be prolonged by many times this figure. Telephone and telegraph poles, which in 10 or 12 years, or even less, decay so badly at the ground line that they have to be removed, can, by a simple treatment of their butts, be made to last 20 or 25 years. Sap shingles, which are almost valueless in their natural state, can easily be treated and made to outlast even painted shingles of the most decay-resisting woods. Thousands of dollars are lost every year by the so-called "bluing" of freshly sawed sapwood lumber. This can be prevented by proper treatment, and at a cost so small as to put it within the reach of the smallest operator.

In the south the cheap and abundant loblolly pine, one of the easiest of all woods to treat, can by proper preparation be made to take the place of the high grade long leaf pine for many purposes. Black and tupelo gums and other little used woods have a new and increasing importance because of the possibility of preserving them from decay at small cost. In the Northeastern and Lake States are tamarack, hemlock, beech, birch and maple and the red and black oaks, all of which by proper treatment may help to replace the fast diminishing white oak and cedar. In the states of the Mississippi Valley the pressing fence post problem may be greatly relieved by treating such species as cottonwood, willow and hackberry.

SNAG BOAT FOR SOUTH AMERICA.

The James Rees & Sons Co., Pittsburg, is preparing a river snag-boat for shipment to South America. The vessel is being taken apart, to be shipped by rail to New York, thence to the Republic of Colombia by steamship. It will be reassembled at its destination, the Magdalena and Cauca rivers, upon which it will ply. The boat was built for DeLima & Co., of New York. The Rees company also has ready for shipment a set of engines of 12-in. diameter and 4-ft. stroke for a government dredge boat in Texas. It has also just shipped a set of engines of 18-in. diameter and 6-ft. stroke, together with four boilers, the plant aggregating 600 H. P. for a government snag-boat on the Yukon river. Since its organization the Rees company has built about 50 boats for South American waters.

W. C. Farrington, vice president and general manager of the Pacific Coast Steamship Co., with headquarters at San Francisco, has resigned on account of ill health. Mr. Farrington is well known on the lakes. He was formerly vice president and general manager of the Northern Steamship Co. of Buffalo and is one of the ex-presidents of the Lake Carriers' Association.

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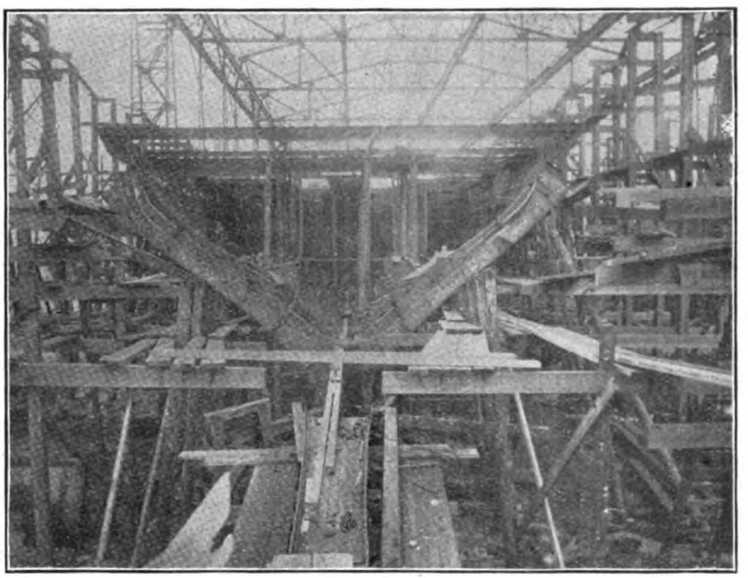
BATTLESHIP NORTH DAKOTA.

Herewith are published photographs showing the North Dakota on March 9. During the week additional frames both fore and aft have been erected; additional plating, both shell and inner bottom, have been fitted and riveted, and the work generally has progressed very satisfactorily. The North Dakota was 21.4 per cent completed on March 4.



BATTLESHIP NORTH DAKOTA ON MARCH 9.

SHIPMENTS TO PANAMA CANAL.

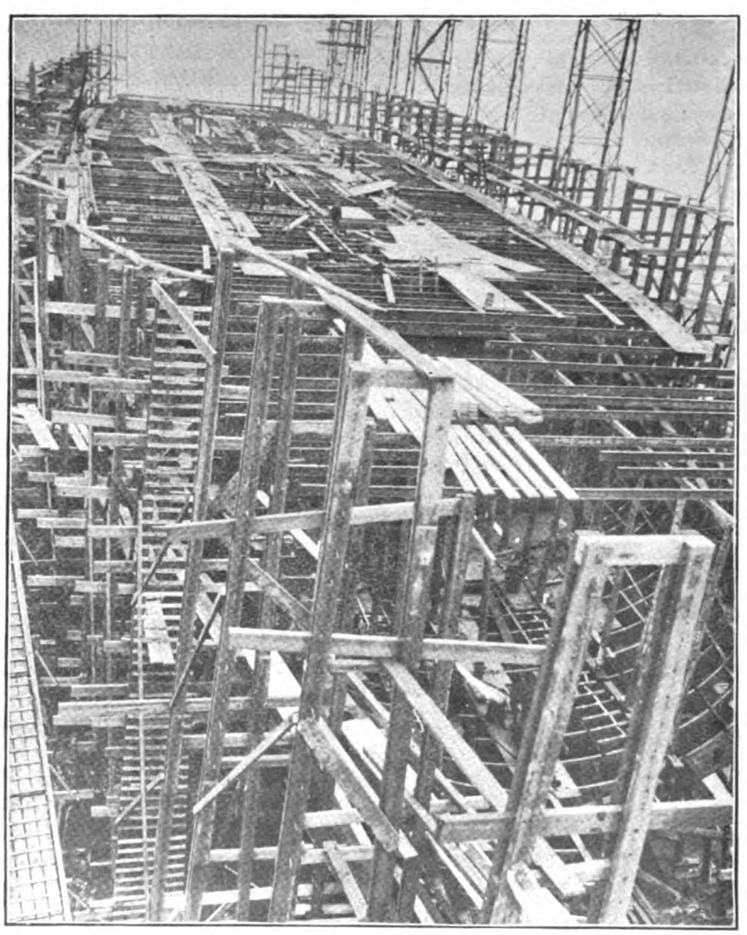
Herewith is given the test of the Frye joint resolution concerning shipments by sea of material and equipment for use on the construction of the Panama canal. It applies to transportation the same principle applied to a resolution of two years ago to the purchase of material and equipment for the canal—that is, it gives the preference to Americans unless their prices are extortionate or unreasonable. It is stated that Speaker Cannon favors this resolution:

"That in any contract hereafter made, transportation by sea of material and equipment from the United States for use in the construction of the Panama canal shall be restricted to vessels owned by the United States or by the Panama Railroad Co., or to vessels of the United States chartered by the United States or by the Panama Railroad Co., or to vessels of the United States tendered by the lowest responsible bidder, unless the president shall in any case deem the bids or tenders therefor to be extortionate or unreasonable: *Provided,* That this resolution shall not apply to any foreign steamship chartered by the Panama Railroad Co. to take the place of any of the present fleet destroyed or undergoing repairs, after the president shall have been satisfied that a suitable vessel of the United States could not have been chartered on reasonable terms for that purpose. *And provided further,* That the Isthmian Canal Commission is hereby authorized to purchase or charter and operate vessels of the United States for the transportation of material and equipment for the use of the canal, employes on, and mails for said canal, whenever in the opinion of the president the public interests will be best so served. *Provided,* That this resolution shall not apply to any port of the United States between which and the Isthmus of Panama there is no vessel owned by the United States, nor by the Panama Railroad Co., nor vessel of the United States, available at any such port when needed and adequate to carry the commerce offered betwen such port and the Isthmus of Panama.

"Sec. 2. That in every such contract the party, or parties, bidding on the same shall be authorized to submit bids to deliver said material and equipment, in the alternative, either,

"First: On docks within reach of the ship's tackle at seaports of the United States named by the bidder.

"Second: On docks, at the option of the bidder, at Colon or La Boca (1) in ships of American register; (2) in ships of foreign register."



BATTLESHIP NORTH DAKOTA ON MARCH 9.

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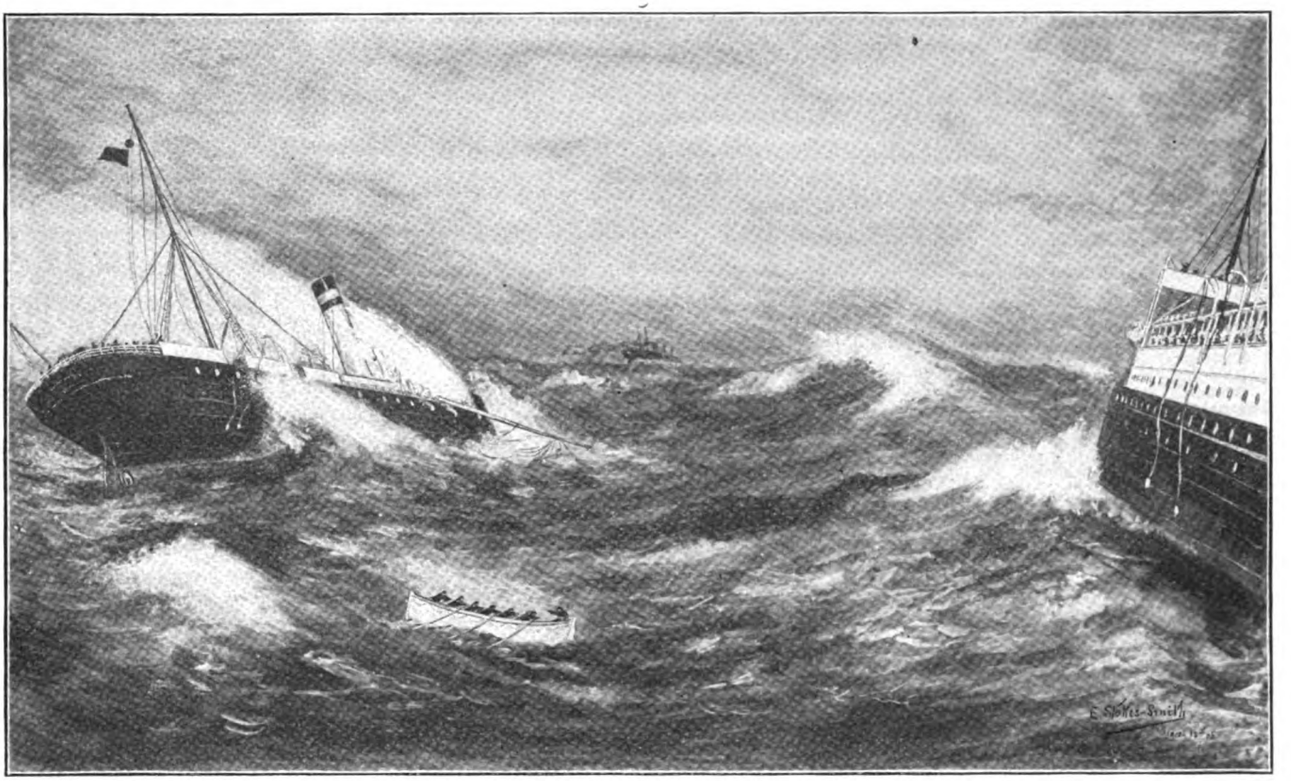
RESCUE OF ST. CUTHBERT'S CREW.

The accompanying sketch was drawn by E. Stokes-Smith, first officer of the White Star liner Cymric, upon the occasion of the rescue of the crew of the steamer St. Cuthbert in latitude 42° 17′ north, 62° 46′ west. The St. Cuthbert was sighted by First Officer Stokes-Smith, at 8:45 A. M., Feb. 3, dense smoke issuing from her fore deck. The captain's attention being drawn to the vessel, the Cymric altered her course and bore down. On nearing the vessel signals of distress were seen flying. A heavy sea was running at the time. For nine hours the Cymric stood by waiting until the sea should moderate somewhat. The lifeboat was then launched with Lieut. J. Stevens in charge and six men who succeeded in rescuing 41 hands from a very perilous position. Three trips had to be made before a complete rescue was effected. The rescue was made under the most trying circumstances, smoke, sea, snow squalls, and a temperature below freezing. The St. Cuthbert had launched a boat, but unfortunately it was smashed, 14 men being drowned on Feb. 2.



RESCUE OF THE CREW OF THE STEAMER ST. CUTHBERT BY THE WHITE STAR LINER CYMRIC.
From a drawing made on the spot by E. Stokes-Smith, first officer of the Cymric.

FOUR MORE STEAMERS ORDERED.

In spite of the general depression in business on the Pacific coast, the Kosmos Co., of Hamburg, Germany, finds conditions so favorable and prosperous in the western traffic that arrangements have just been completed for the dispatch of four additional steamers regularly employed on the line having its terminus at San Francisco.

The steamers added to the San Francisco line are the Radames, which is now on the way from Europe and due to arrive at San Francisco about June 1 by way of South America, Central America and Mexican ports, with first, second, and third-class passengers as well as freight. The other liner to come to San Francisco is the new Sabara, which has just sailed from Hamburg.

The growing traffic built up on the Pacific coast by the Kosmos Co. long ago showed its effects on the Pacific Mail business even before the latter company's exclusive privileges over the Panama Railroad expired. The business has, in fact, shown such possibilities that the Chargeurs-Reunis Co. of France has been quick to jump into the trade.

THE NICHOLSON SHIP LOG.

The value of the Nicholson ship log is fast being recognized by every class of yachtsmen, as well as by the merchant steamships and the navies. Henry Doscher, of New York, has just ordered one of the No. 2 Nicholson logs to be installed on board his schooner yacht Zuhrah. This yacht participates in the Bermuda race next June. By being equipped with the Nicholson log, her skipper can tell at a glance the effect of trimming or altering sails, he is thus enabled at all times to obtain the best speed possible. The minister of marine of the Italian navy has ordered a No. 1 Nicholson log for the battleship Vittorio Emanuele, and a No. 1 log has been ordered for the Texas Oil Co.'s new tank steamer Texas. The eastern agents of the Nicholson Ship Log Co., are Messrs. Barrett & Lawrence, 662 Bullitt building, Philadelphia.

ITEMS OF GENERAL INTEREST.

A special test of the submarine boat Lake was held on Long Island Sound off the mouth of Black Rock harbor near Bridgeport last week under the direction of a special naval board consisting of Capt. Adolph Marix, Commander C. C. Marsh and Naval Constructor D. W. Taylor, the object of the test being to demonstrate the ability of the craft to maintain an even keel. Submergence tests were made at 30, 20 and 10 ft. The conclusions of the board will be filed with the secretary of war.

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THE MARINE REVIEW

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OCEAN MAIL ACT.

The ocean mail act was passed by the United States senate by a viva voce vote on March 20. A few amendments were accepted and made part of the bill. Senator Newlands sought to have a provision incorporated in the bill for an auxiliary naval force for utilization in case of war, but it was agreed that this should be taken up in connection with the naval appropriation bill. The measure as passed provides for an expenditure of somewhat less than $4,000,000 per annum for a period of 10 years. This amount does not exceed the present profits realized on sea postage. The bill pays 16-knot steamers plying between this country and South America, the Philippines, Japan, China and Australasia, $4 per mile, which is the amount awarded by the ocean mail act of 1891 to 20-knot steamers. An amendment was passed allowing 12-knot steamers $2 a mile, which is the present allowance to 16-knot steamers. Amendments were also adopted that if two or more lines of steamships were plying from Atlantic ports to South America under provisions of the bill, one line should stop at two ports south of Cape Charles, and stipulating that no more should be paid for subsidies than is received for ship service by the government.

A notable speech was made by Senator Hale, chairman of the committee on naval affairs. He spoke of the great need of additional auxiliary ships for the navy but held that they should be provided for in the naval appropriation bill. He pointed to the fact that of the 29 colliers, now accompanying the American squadron on its Pacific cruise only one was an American collier. "If there should be war," said he, "no government would allow us to use one of these colliers, and without them our magnificent ships would be as useless as a painted ship upon a painted sea." The senator felt that the people did not realize how helpless the fleet actually was because in the event of international complications these colliers might have to be withdrawn by their respective governments under the laws of neutrality. He declared that something must be done in this entirely neglected field that the government has in a foolhardy way rashly abandoned in the past. Senator Burkett did not think that it was right to tell the world that the United States was in the miserably hopeless condition pictured by Senator Hale. Naval powers are quite well aware of it, however, so that there is no occasion for secrecy. The text of the bill as passed is as follows:

To amend the act of March 3, 1891, entitled "An act to provide for ocean mail service between the United States and foreign ports and to promote commerce."

Be it enacted by the senate and house of representatives of the United States of America in congress assembled, that the pastmaster general is hereby authorized to pay for ocean mail service under the act of March 3, 1891, in vessels of the second class on routes to South America, to the Philippines, to Japan, to China and to Australasia 4,000 miles or more in length, outward voyage, at a rate per mile not exceeding the rate applicable to vessels of the first class as provided in said act, and in vessels of the third class on said routes, at a rate per mile not exceeding the rate applicable to vessels of the second class, as provided in said act:

Provided, That if no contract is made under the provisions of this act for a line of ships between a port on the Atlantic coast south of Cape Charles and South American ports the postmaster general shall, provided two or more lines are established from north Atlantic ports, require that one of said lines shall, upon each outward and homeward voyage, touch at at least two ports on the Atlantic coast south of Cape Charles, regard being had in the selection of such ports of call to geographical location and to the volume of the export and import business of the ports so selected:

Provided, further, That the total expenditure for foreign mail service in any one year shall not exceed the estimated revenue therefrom for that year.

BULK FREIGHTERS NOT COMMON CARRIERS.

The Interstate Commerce Commission has decided that bulk freighters engaged in the coal, ore and grain trades of the great lakes are not common carriers. The express opinion prepared by Commissioner Franklin K. Lane is as follows:

"It has been the uniform interpretation of the law that an all-water carrier engaged in carrying freight originating at New York or New Orleans may engage in such traffic between such ports without publishing its rates with this commission, and so may the steamships plying between Seattle and San Francisco, or the carrier which transports freight from Duluth to Chicago on the great lakes, or the river carrier from Memphis to New Orleans, but if such water carriers are controlled or managed by the same corporation as controls or manages a rail line, or if between a rail and water

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line there is an arrangement for continuous carriage, then such water line becomes subject to all the provisions mandatory and prohibitory of the act to regulate commerce."

In August, 1906, Mr. Harvey D. Goulder, counsel for the Lake Carriers' Association, delivered an opinion that the bulk lake freighter was not a common carrier. This opinion was printed by the Lake Carriers' Association and is as follows:

BULK FREIGHTERS.

1. The ordinary bulk freighter of the great lakes, engaging her capacity as the owner sees fit in any trade, with no fixed route, is not, in my judgment, a common carrier within the intent and purpose and definitions of the law.

2. The act has a provision in section 6, amending section 20 of the old law, that the initial carrier on a joint, through route shall be liable for loss or damage, whether occurring on its own or on that of a subsequent carrier. The immediate language is "common carrier, railroad or transportation company," and this provision might possibly de claimed to apply if the ship should take cargo for a continuous, joint carriage by the vessel and subsequent railroad line or lines, upon a through, general rate to be divided by and among herself and subsequent carriers. Our bulk freighter, however, does not hold herself out to carry over joint water and railroad lines or any line beyond her own lake delivery port, has no arrangement with other carriers for a combined, joint route and does not make a rate to be divided by and among herself and succeeding carriers, and the whole law is so directed in its terms to described common carriers and to conditions of common control or management or arrangement for continuous transportation, that I can see nothing in the law to affect the bulk freighter, even though there may be an ultimate further delivery intended or expressed.

At the same time, it would be advisable for the representatives of the ship to see that the billing does not follow the ordinary practice and is for carriage by the ship to her lake port of destination, and expresses her freight rate for that carriage; and it would be just as well to avoid such general expression as "freight as per contract," but express the lake freight definitely, or for example, "freight to Buffalo as per contract," or "lake freight as per contract."

3. Concerning the question of delivery, I think it may safely be stated as the law that if the cargo is consigned to her lake port merely to the order of some party, the ship is not safe in delivering without production of the original bill of lading, and cancelation, or receipt discharging the ship, by some one authorized. Direction to notify some party, while it should be complied with, is not a direction to deliver. Where, however, cargo is consigned in care of a party, unless there is timely notification to the contrary from the owner and holder of the original bill of lading, delivery to the party in whose care the cargo is consigned is good delivery according to custom and reason.

4. A bill is in preparation by a committee of the Bankers' Association in conjunction with the other interests, to establish a more definite practice than has heretofore obtained for safeguarding the shipper, the banker who makes advances and the carrier; in which, by invitation, the president and counsel are taking appropriate part. It is hoped that this legislation, which cannot be had before next winter, will make everything clear.

But in my opinion, this matter can well be cared for in the manner above suggested with due safety to shipper, bank and bulk freighter. A reasonable precaution by a bank advancing money would be to fix some agency in Buffalo, say its bank correspondent, to which cargo is to be consigned, or which is to be notified before any delivery. It is also important that the ship's copy of the bill of lading, though not negotiable, correspond exactly with the original bill.

PASSENGER AND PACKAGE FREIGHT LINES.

1. Such of these as run between fixed termini and hold themselves out to carry generally for the public are doubtless included in the term "common carriers" as intended in this law. As to their business carried in connection with railroads upon a through, joint route, with through rate divided among the successive carriers, either for the carriage of passengers or goods, they must comply with the various provisions of the law applicable to that business.

2. A question of difficulty upon which contrariety of opinion may be expected concerns the carriage of property from a point in one state to a point in some other state or foreign country, which carriage begins and ends with such water line, with no through routing and no through rates.

Agreeing with previous decisions, the law expressly says that business which in its character is in fact through business may not be interrupted for the purpose of avoiding the provisions of the act. As to this class of business, passenger and freight, taking into account the purpose and the intended application of the law, as specified in the opening section especially, and elsewhere throughout the act, my opinion is that, granting such water transportation company to be a common carrier, business local to its own line, in good faith beginning and ending its carriage at termini of that line, even if it does pass from one state to another, does not come within the operation of the law, notwithstanding the same lake carrier may at the same time carry other business on through routing and joint rates, as to which it is within the provisions of the law.

LIMITED LIABILITY AND HARTER LAWS.

As to package freighters, the question deserves careful consideration whether the provision imposing liability on the initial carrier of property has the effect to modify or repeal the relieving provisions of the Harter act, or of the statutes providing for limitation of liability. There is room for differences of opinion, and the question so nearly concerns the lake and rail lines, that it may be expected that these will deal with it through their own counsel. For my own part, I have reached the conclusion that this provision was not intended to have, and does not have this effect, for reasons and upon authorities which it would be quite out of place to present here in detail. Considering the general purpose of the whole law, and that it concerns vessels only incidentally and partially, while the limited liability and Harter acts are particular laws professing to regulate in detail the liability of vessels, it seems to me that the present act is not intended to affect the creation of liability, but leaves this to definition by existing law. It contains a stereotyped clause providing for the repeal of all inconsistent laws and parts of laws, but this does not refer to any particular laws and occurs not in connection with the provision under consideration, but at the end of the entire act. It has no other affect than repeal by implication under the accepted rules of statutory construction; and under these rules, in my opinion, the present act and the limited liability and Harter laws can stand together.

On the view heretofore expressed, that the law does not apply to bulk freighters, as to them in any event the Harter and limited liability laws are not affected.

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PRIZE WINNING ESSAYS

Award of Prizes by the Merchant Marine League of the United States For the Best Essays on the Subject "How to Upbuild the Merchant Marine of the United States in the Foreign Trade."

A YEAR or more ago the Merchant Marine League of the United States offered $1,000 in prizes for the four best essays submitted upon the subject "How to Upbuild Merchant Marine of the United States in the Foreign Trade," the first prize being $400, the second prize $300, the third $200, and the fourth prize $100. The contest was limited to students attending high schools, technological schools, colleges and universities in the United States. The Merchant Marine League distributed among contestants as they enrolled such documents as it possessed and gave to each contestant complete information as to where additional information might be secured. For instance, they were informed that the Library of Congress had compiled a bibliography of all works, both American and foreign, bearing upon the subject, the greater portion of which are to be found in all libraries.

About 400 essays were submitted. The judges appointed to examine the essays were: Judge Robert W. Tayler, of the United States district court, for the northern district of Ohio; Rev. J. Leonard Levi, the eminent Jewish rabbi of Pittsburg; and Mr. Frank D. Lelanne, a retired merchant of Philadelphia, and president of the National Board of Trade. The result of their examination was announced by Judge R. W. Tayler at the annual dinner of the Merchant Marine League held at the Hollenden in Cleveland, Dec. 22. The awards were distributed as follows: First prize, Clifford S. Johnstone, 535 Third avenue, Detroit, Mich.; second prize, Wm. P. Munger, Sigma Nu House, Nashville, Tenn.; third prize, J. G. Honnold, University of Minnesota, Minneapolis, Minn.; fourth prize, L. M. Erskine, Zeta Psi House, Brunswick, Me.

The essay to which the first prize was awarded is published herewith. The other three will be published later. Concerning this essay the judges wrote:

"This essay is evidently written by one thoroughly familiar with the situation and who recognizes the only practical remedy that congress is likely to apply. While the essay is a short one, no point bearing upon the present situation has escaped the attention of the author. He has, in fact, manifested singular ability in compressing into single sentences the causes of the present decline, the results, the practical remedy and its probable effects. He exhibits unusual penetration in limiting his direct remedy to mail subsidies because this is a practical remedy against which no sound opposition can be brought. He suggests that a bounty be paid to companies building ships of over 20 knots speed, the navy department to supervise the plans. Such ships would add greatly to the strength of the navy as auxiliaries, such as transports, colliers and supply ships. He points out that the first effect of such a measure would be upon the ship yards, enabling them to standardize in the construction of ships and to reduce expenses thereby. As concrete evidence he points to the Ocean Mail Act of 1891 which, while inadequate, certainly stimulated ship building and is responsible for the slight growth that the American merchant marine in the foreign trade has experienced in the past several years. He thinks the cost could be met by an increase in tonnage taxes, which are now ridiculously low. He suggests, but does not recommend, a system of discriminating tonnage taxes. He calls attention to our lack of transports and colliers, saying that a navy of immense battleships is as useless as an unloaded gun without them. This statement is effective and in a way prophetic. The squadron at present on the way to the Pacific ocean could not possibly make the trip without the assistance of foreign colliers."

THE MERCHANT MARINE.

BY CLIFFORD S. JOHNSTONE.

Before we take into account the ways and means of reconstructing the American Merchant Marine, we must consider the reasons why it has not been able to take care of itself.

At present the American marine is not on a competing basis with foreigners. The principal foreign countries give material aid to their merchantmen by subsidies of from 25 per cent to 75 per cent of the cost of maintenance for carrying mail, mileage, tonnage or other bases of computation, and nearly all countries discriminate in favor of home-built vessels. The subsidized foreign ships can, therefore, give rates that are ruinous to their would-be American competitors.

The cost of building ships is greater in America. In a British ship yard a ship can be put out in one-half the time and at two-thirds the cost of an American ship and the work will be just as good. Furthermore, a foreign ship is run for from 50 to 15 per cent less than an American ship. On an American ship the wages, accommodations and food are better than on the average foreign ship and consequently the bill runs higher.

At present the ship yards are few and far between. The only thing that keeps them alive is the building for the coasting trade and the navy contracts. There is not work enough to give employment to any large body of men permanently, so the American ship builders do not have the opportunity to become as proficient in the trade as their English cousins.

Therefore, we see that the American ship yards are at a disadvantage at all times. The initial cost is greater, the cost of running is greater and we have to compete with people who can cut their rates almost to nothing and still run at a profit.

It is foolhardy to believe that this deplorable condition can be changed all at once. It will take years of development. All the merchant marine needs is a start, some legislation to give it a first shove and it will work out its own destiny as other industries have done before.

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The problem before the government is to create the incentive for private capital to build and operate ships. As has been demonstrated by foreign countries the only feasible plan for doing this is to organize some system of subsidies. This would be best done by a system of mail subsidies, given only to American-built ships owned by companies whose interests are at least two-thirds American. Lines should be subsidized touching at every country in the world. Every route should be considered separately, and the subsidy and requirements as to speed, size and construction of vessels made to fit the conditions; a larger subsidy to the company with the larger expenses, and better, more regular and more frequent service. Ships of high speed and large size to the countries of Europe; ships of less speed but larger carrying capacity to the more distant countries. A bounty could be paid by the government to companies building ships of over 20 knots an hour speed and 8,000 tons. The navy department to supervise the plans and construction. Such ships would add greatly to the strength of our navy and would be very useful in times of war as transports, scouts, colliers, supply and dispatch boats.

CLIFFORD S. JOHNSTONE.

CLIFFORD S. JOHNSTONE, WHO SUBMITTED THE ESSAY TO WHICH THE JUDGES AWARDED THE FIRST PRIZE, WAS BORN IN TORONTO IN 1889 AND MOVED TO DETROIT IN 1900. HE IS AT PRESENT A STUDENT AT THE CENTRAL HIGH SCHOOL IN DETROIT, FROM WHICH HE GRADUATES IN JUNE NEXT. IT IS HIS INTENTION TO ENTER THE RENSSELAER POLYTECHNIC SCHOOL AT TROY, N. Y., NEXT FALL.

The most important result of the merchant marine would be the development of the American sailor. The seamen of the merchant service are the backbone of every navy and no expense should be spared to obtain such a reserve. Before young men will go into the merchant marine they must be assured that advancement can be ob-

FROM THE BUFFALO VIEW POINT.

Buffalo, March 17.—When they put the name of Capt. J. J. H. Brown on a new steel monster the other day it was natural for his friends to congratulate him, which they all did with the utmost loyalty and sincerity, and it was also wise and proper to make a note of the steady increase of the names of steamboat companies that are making their appearance on his office front door. It is a way that good lake men have of doing a service to the trade as a whole. But when someone spoke to Capt. Brown of some of these things one day he was for the moment the old, that is to say, the young lake captain who was without doubt a far prouder man on a certain occasion than he ever will be again.

It was on that not-to-be-forgotten day, 35 years ago coming May 1, if I have not forgotten the date, when he brought out the schooner Scotia. He did not choose to speak of the incident very especially, though, only so far as to remark that she was a bigger boat in her day than any are in this day, for has she not a record of carrying a cargo of 60,028 bushels of wheat! and what laker of today with its record of that cargo seven times over is much ahead of a dozen others of the same sort, and all with the same shape from end to end?

But they do say that Capt. Brown went into the ship owning business of late somewhat doubtfully. He is never tired of speaking in a sort of ruefulheroic way of the days when he was lying awake nights keeping the storied steamer Araxes and her tow afloat, but when that period of varied experiences passed and with it the boats of that class mostly he was content to lie awake nights as well as days, looking after the ships that other people were wise enough to build and own, but who were not all as active as the late Capt. John Shaw, that is to say, not quite able to watch their fleets in and out of both Buffalo and Chicago every trip. But the persuasions of others worked a change of policy and behold the return to ship owning.

Buffalo is beginning to point with pride to the fact that she is a ship owner again. This was always the headquarters of the package-freight lines and nearly all of that class of vessel is either managed or hailed from here, mostly both, but the individual ownership of what the ocean people would call tramps was in late years small, in fact, much smaller in proportion than it was when it seemed to be the thing for Capt. Frank Perew

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tained. To attract young men the government should establish schools of navigation where ambitious sailors could, at a nominal cost, obtain the knowledge needed to get them a mate's berth. On all subsidized ships all officers and 50 per cent of crew should be American citizens.

There is no doubt as soon as such a law was passed that the shipping world would be thrown into activity. The first effect would be on the ship yards. The demand would exceed the supply, new yards would be formed and the capacity of the present ones increased. The construction of ships would be standardized and the expenses thereby reduced. It would offer steady work for a large class of men who would each become familiar with some one task—one man do nothing but riveting, another nothing but drilling, and so on. It would be the story of the American locomotive industry over again. Standardization enables the American locomotive builder to compete successfully with the world, in spite of higher wages and greater cost of material.

The establishment of these mail and express lines would develop trade relations all over the world, and create the American tramp steamer. There would be no reason why the subsidized American ships could not compete successfully with all foreigners. As a natural consequence the American tramp steamer would be built and follow as surely as every cause has its effect.

A splendid mail service to all parts of the world would be rendered, as such would be the chief interest of the companies—the better service the larger subsidies.

That this scheme is practicable is amply demonstrated by the Postal Aid Act of 1891, which, although inadequate, caused the formation and remains the support of a few lines:

The American Line, New York to Southampton	4 steamers.
Ward Line to Cuba and Mexico.....	17 steamers.
Red D Line, New York to Venezuela.....	5 steamers.
Admiral Line, Boston to Jamaica.....	4 ships.

The Oceanic Steamship Co. runs six ships from San Francisco to Australia.

All these ships have increased United States trade with the countries to which they run.

The United States can well afford to give generous subsidies in face of the benefits that would be received. The cost could be met by an increase in tonnage taxes which are now ridiculously low in comparison with those of other countries. A system of discriminating tonnage taxes might be devised, but, as with discriminating duties, the risk of retaliation is great—retaliation that would put us in a worse plight than ever.

Conditions are such that immediate action is imperative. We are paying over $200,000,000 annually to foreign vessel owners for the carriage of our goods; we have no naval reserve and in case of a naval war would have to resort to drafting and would then get only landsmen, wholly unfamiliar with the sea. We would have not a sufficient supply of transports. We could not put our troops on foreign grounds quickly, could not act decisively. What is the use of a navy of immense battleships without swift scouts, large supply ships and colliers; it is as useless as an unloaded gun.

All these things can only be obtained by some action of congress tending to build up the merchant marine. Of all possible methods the giving of mail subsidies seems to be the most plausible and economical and stands the most chances of success.

Such legislation by congress would revive the ship building trade, give permanent employment to a very large body of men, place the American flag on every sea, pay into the hands of American citizens, in part, at least, the money that is now being paid to foreign ship owners, establish efficient mail service to all parts of the world and form an invaluable arm of the army and navy.

and other ship owners to sell out to some collector of craft in Cleveland and retire. Then followed a period of mostly vessel management here without much increase of tonnage owned. A few ventures in the line ownership and management and ownership was about at a standstill.

But it did not last long. There was money to be found that was more or less eager to be set afloat, like the scriptural bread, to see if it would not return, not only after many days, but every few days, bringing with it other money that had been collected on the way. The fact that these returns have been made rather fast and large of late has made it still easier to multiply the Buffalo individual or syndicate fleets, till now it is found that there are to our credit a matter of about 25 of the large-class steel steamers, not to mention quite a large fleet or two owned to a great extent here, but hailed and managed further up the lakes. Whether this fleet is to be added to much in the near future is matter for doubt, for ship building and ship promoting has received a very bad black eye of late and a sudden halt has had to be called.

In talks with certain vessel men who are on the inside in more ways than in mere ownership of craft, I find that the belief is strong that the prediction, made in vain for more than 20 years, that we were overbuilding the lake fleets, has now come true with a vengeance. The monster fleet has gone on the rock, not only of excessive numbers, but of bad times, and there is to be a period of "nothing doing," at least till the new state of affairs can be well shaken down or shaken up and it is found really "where we are at," whether we are really all afloat with a clean bill of health or all at sea with the yellow flag up.

Still I am not the one to croak now. It is too soon for that, even if a vessel owner did say last week that he was ready to farm out his profits for the coming season at 6 per cent. It may turn out that he gets 30 per cent again as some have been doing with more or less regularity in late seasons It looks like anything but that now, though. Somebody says there is from 15,000,000 to 17,000,000 tons of ore on the lower-lake docks and furnace yards, and the worst of it is that not only is a good part of it unsold, but the people who bought of it last year cannot be persuaded to take it away.

Let the people who have been making such profits mark off this season, credit it to profit and loss, as the

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phrase is, and they will be ready to come up smiling by next season anyhow. One thing is certain, if this is to be a strictly bad season, as it looks now, it will be the first straight one for a quarter of a century. We have had partial ones in that time, but never one that was disastrous all the way through. The cry of overbuilding has always gone up, but the revenue has showered down in spite of it all. JOHN W. CHAMBERLIN.

GREAT LAKES TOWING AND LABOR.

The Great Lakes Towing Co. has concluded an agreement with the tugmen which insures peace for the next two years. Both sides are pleased with the arrangement which was not, however, easily reached. The officials of the Great Lakes Towing Co. and the representatives of the Licensed Tugmen's Protective Association and the Tug Firemen and Linesmen Association were in session all last week. Both sides worked hard but little progress was made. Finally such sections as could not be agreed upon were referred to committees, on which both sides were represented. The men had demanded quite a number of changes which increased the operating cost of the company, owing to shorter hours involved in certain instances. Agreements were finally reached on practically the same basis that has obtained during the past two years. The tugmen will receive the same wages that they got in 1906 and 1907. The new agreement which goes into effect May 1 next will continue until May 1, 1910.

The wages to be paid licensed tugmen under the agreement during each of the years 1908 and 1909 shall be at the following rate per month for such time as the men are employed:

CHICAGO.

Captains	$161 29
Mates, permanent	86 29
First engineers	116 29
Second engineers, permanent	86 29

SOUTH CHICAGO.

Captains	$141 29
Mates, permanent	86 29
First engineers	116 29
Second engineers, permanent	86 29

DULUTH, ASHLAND AND MARQUETTE.

Captains	$136 29
Mates, permanent	86 29
First engineers	116 29
Second engineers, permanent	86 29

ALL OTHER PORTS.

Captains	$131 29
Mates, permanent	86 29
First engineers	116 29
Second engineers, permanent	86 29

Extra captains and engineers to be paid at the same rate of wages as regular captains and engineers for the first fifteen days or less; if they should quit before expiration of a trip they shall receive pay at rate of permanent mates and second engineers.

Winter wages from Jan. 1 until April 1 in each of the years to be $3 per day for captains and engineers for ten hours or less. Overtime to be paid at the rate of 50 cents per hour, but not to exceed summer wages.

The wages to be paid firemen and linemen under the agreement from April 1 to Jan. 1 during each of the years shall be at the following rate per month for such time as the men are employed:

Ashtabula, Buffalo, Cleveland, Chicago, Duluth, South Chicago, $60. All other ports, $55.

Winter wages from all ports from Jan. 1 to April 1 in each of the years to be $2 per day for 10 hours or less, but if they work over ten hours per day board shall be allowed.

The Tugmen's Unions are affiliated with the International Longshoremen, Marine and Transport Workers' Association. President Keefe of the organization was present at the conference.

IMPROVEMENTS AT SAULT STE. MARIE.

An important meeting of the rivers and harbors committee will be held in Washington next Monday to consider a bill which has been offered in congress by Representative Young of Ishpeming regarding water rights in the rapids at Sault Ste. Marie. The river and harbor bill of 1907 forbade the granting of any fixed rights in the rapids, or of any licenses except upon the express condition that whenever the government needed the property for purposes of navigation it could be taken over without compensation. Congressman Young's bill amends this by giving the war department discretionary powers and recognizing that fixed rights may be granted. The whole subject is one of the utmost importance to lake navigation and many needed improvements have been delayed at the Sault by litigation arising out of the interests of private parties in the rapids.

The executive committee of the Lake Carriers' Association met this week to consider the matter and consulted Congressman Burton by telephone with the intention of postponing the hearing if possible until President Livingstone of the Lake Carriers' Association would return from California. Mr. Burton feared that the meeting could not be postponed and an effort will therefore be made to have Mr. Livingstone return from California in time to attend the sessions next week. Mr. Livingstone has given a great deal of study to this subject.

SUMMARY OF ICE CONDITIONS.

The reports of the ice conditions from the regular and display stations of the weather bureau indicate that there are extensive fields over the western, central and eastern portions of Superior, but that the fields are not heavy and are well broken up. The ice in Whitefish bay has been packed solid during the week. There have been no material changes in the St. Marys river. The ice in Green bay remains firm, but has some water on top. In Michigan, the ice is confined to the northern portion of the lake, from Traverse bay north to the straits. At the straits the ice remains firm; the snow has melted from the top during the week. In Huron the ice fields are moving with the wind and are broken up; over the extreme southern portion the field has moved out of sight. The ice has been running slowly out of Lake St. Clair. The Detroit river remains free of ice. In Erie the fields are confined to the eastern portion of the lake, except small fields around the islands; the ice fields are beginning to break up and move with the wind. In Ontario the ice is confined to the extreme eastern portion; the harbors are opening.

In comparison with the same period last season the ice fields in Superior are more extensive but not as heavy. The conditions are not as favorable in Green bay or at the straits. In Huron there is more ice reported. In Erie the area of ice is about the same but it is somewhat heavier. In Ontario the harbors have more ice in them, otherwise the conditions are the same.

Capt. James Corrigan has sold the steamers Caledonia and Italia to John J. Boland of Buffalo. The engines of both steamers were previously taken out and placed in the barges Polynesia and Amazon of the Corrigan fleet.

New machinery will be installed on the Caledonia and Italia by the Great Lakes Engineering Works. The boilers will be new, but the engines will probably be those that have served in other steamers.

The improvement of the West Neebish channel in St. Mary's river has been completed and the new channel will be opened to navigation June 1 to downbound boats.

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On Circles—The Diameter and What Can be Done With It

The diameter of a circle multiplied by the mixed number 3.1416 produces the circumference of that circle; or dividing the diameter of a circle by the decimal .3183 gives the same thing.

Ex.—The diameter of a circle is 180 feet, what is its circumference in feet?

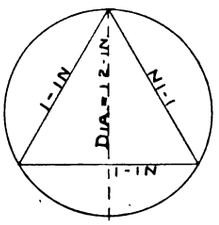
3.1416
180

2513280
31416

565.4880 ft. in circum.

180 ÷ .3183 = 565.5.

The diameter multiplied by .8660 equals the side of an inscribel equilateral triangle; or the diametter divided by 1.1547 will equal the same thing.



AN INSCRIBED EQUILATERAL TRIANGLE,

Each side is 1 in., and the diameter of the circle containing it measures 1.2 in.; therefore, example:

.8860
1.2

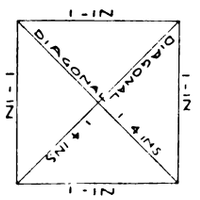
17720
8860

1.06320 = practically 1.

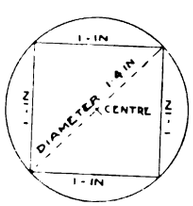
1.1547)1.20000(1.0

1 1547
4530

The diameter multiplied by .7070 will equal one side of an inscribed square; that is to say, let the diameter of the circle that passes through the four corners of a perfect square, be multipled by .7070, and it will equal the measure of one side of the square; or the diameter multiplied by 1.4142 will give the same thing.



A SQUARE.



INSCRIBED SQUARE.

The inscribed square and how it is drawn:—Find the center of your square by drawing the diagonal from opposite corners; the diagonal is the same thing as the diameter of the circle that will exactly contain the square. With one leg of pencil compass at the center and the other placed at any corner of the square draw a circumference. Twice the radius, or distance between the leg and pencil of compass, will equal the length of the diameter of the circle, or the length of the diagonal measures the diameter; in this case 1.4 in.

.7070 factor
1.4 diameter

28280
7070

.98980 = practically 1, or 1 in.

What is the length of one side of the largest square that can be drawn within a circle whose diameter is 2½ ft.?

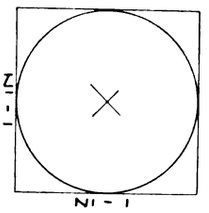
Rule—Multiply the diameter by .7070; thus:

.7070
2.5

35350
14140

1.76750 ft. = 1 side of square.

To draw a circle within a square—The diameter of a circle that will just go into a square is equal to any side of the square.



RADIUS ½-IN.
THE CIRCUMFERENCE.

The circumference multiplied by .3183 equals diameter. Ex.—Diameter is 2 in.; what is circumference?

3.1416
2

6.2832 = inches circum.
.3183

188496
502656
62832

188496

1.99994256 = practically 2 in. diameter.

The circumference divided by 3.1416 will give the same thing.

The circumference multiplied by .2756 equals the side of an inscribed equilateral triangle. Example:

3.1416 factor.
1.2 diameter in inches.

62832
31416

3.76992 circum. in inches.
.2756 factor

2261952
1884960
2638744
753984

1.039069952 = practically 1.

The circumference divided by 3.6276 equals the same thing.

The circumference multiplied by .2251 equals the side of an inscribed square.

3.1416
1.4

125664
31416

4.39824 circum.
.2251

439824
2199120
879648
879648

.990043824 = practically 1.

The circumference divided by 4.4428 will give the same thing.

The circumference multiplied by .3183 equals the diameter of that circle. Example:

4.3982 circum.
.3183

131946
351856
43982
131946

1.39994706 = 1.4 diameter.

OBLIQUE SAILING.

The solution of oblique angled sailing is a simple problem in trigonometry, but it is not necessary to be a mathematician of the higher order ot be able to work problems of this kind. Here is an explanation of it in simple arithmetic.

Oblique sailing is where the angles

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of the triangles form either a scalene or isosceles. We have seen how to get the distance apart of two vessels running the same distance on courses not more than a point difference by the arc of the circle included between the lines or sides of the given courses. When the angle is more than a point the arc of the circle no longer equals a straight line, or the side to be fouund; it must now be found in an altogether different way.

Problem:—One vessel sails North 100 miles, the other NE 100 miles. How far apart will they be after each has run this distance, both starting from the same point?

One hundred miles equals radius; 200 miles diameter. First determine the distances in a straight line from North to East. This line will be the chord of a circle. It will be seen at once, even without reference to the accompanying diagram, that this distance is equal to the side of an inscribed square, the circle of which has a diameter of 200 and a radius of 100 miles. The side of an inscribed square is equal to .7070 of the diameter; therefore if we multiply the diameter by .7070 it will give us the length of the line from North to East. See diagram. The distance is 141.4 miles. Next draw a radial line to represent the course NE; this will divide the side of the inscribed square or chord exactly in half; hence, the distance from B to H is 70.7 miles; AB equals same distance, since it is one-half of altitude, and altitude equals one side of square. We know that radius equals 100 miles, therefore, if it is 70.7 miles from A to B and 100 miles from A to C it must be their difference from B to C. This gives us two sides of a right angle triangle (base and perpendicular) to find the third side (hypotenuse), which equals the straight line distance between the vessels, or from C to H. The square upon the hypotenuse is equal to the sum of the squares upon the other two sides; hence, the square root of the sum of their squares equals hypotenuse, or the side CH.

```
  70.7      29.3
  70.7      29.3
 ------    ------
  4949       879
4949        2637
------       586
4998.49    ------
           858.49
          4998.49
          ------
          5856.9800(76.53
             49
            ---
        140) 956
           6 876
          -----
       1520)  8098
          5  7625
      15300) 47300
          3  45909
          -----
```

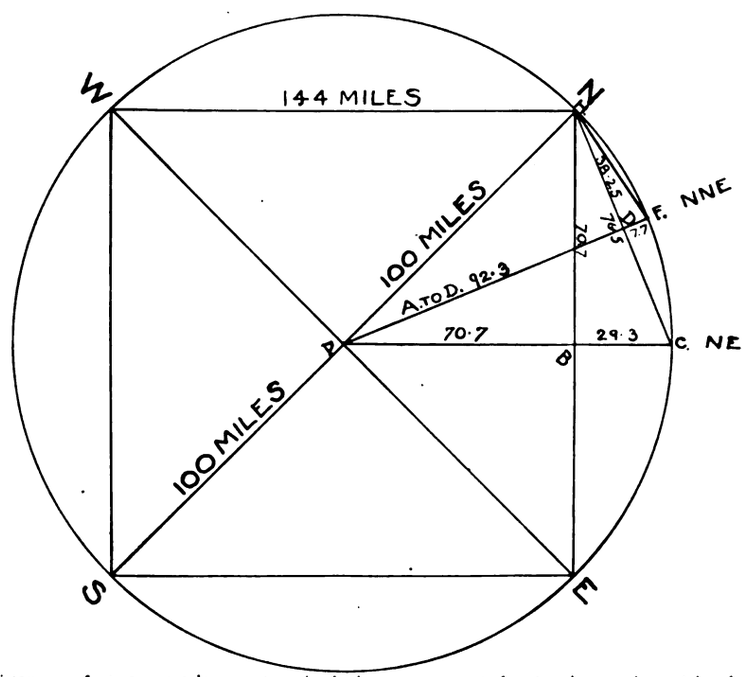
The distance to CH is therefore 76.53 miles.

Problem: One vessel steers North 100 miles, the other NNE 100 miles, how far apart will they be at the end run.

D to H equals ½ of C to H, or 38.25. The next thing to find is A to D; we have DH and AH, the hypotenuse and base; hence, the square root of the square of the base subtracted from the square of the hypotenuse, will give the side AB, or the perpendicular of that right angle triangle.

The square of 100 is 10,000; the square of 38.25 is 1,465; 1.465 from 10,000 equals 8,535, and the square root of 8,535 equals 92.3.

If A to D is 92.3; DF will equal 7.7, since A to F equals 100.



Distance of two vessels apart solved by square root by turning scalene triangles into right angled triangles.

Knowing DH and DF we can find FH the same as before. The square of 38.25 equals 1,465; the square of 7.7 is 59.29; the sum of these squared equals 1,524.29 and the square root of 1,524.29 is 39. Therefore, the two ships will be 39 miles apart.

From H to E on circumference equals 156.8; HE on straight line equals 141.4. From H to C on circumference, 78.4; H to C on straight line, 76.5; H to F on circumference, 39.2; straight line 39.

It is simply astonishing how some of these most difficult problems can be solved in a simple way when a little thought and reason are injected into the work. A half dozen or more solutions have been given to the foregoing problems, some of them very intricate to the ordinary person, but this is the first time that this very simple solution of the problem has ever been demonstrated.

THE ELLIPSE.

An ellipse is a plane figure bounded by a curve, the sum of the distances from every point of which to two fixed points is equal to the line drawn through those points and terminated by the curve. The two points are called foci; the line trough the foci is the major axis or diameter (equatorial diameter), and the one perpendicular to it, the minor axis or diameter (polar diameter). In the ellipse ABCD, E and F are the foci. If a straight line (EQF) be drawn joining the foci, and then be bisected, the point of bisection is called the center. The distance from the center to either focus (EQ or QF) is called the eccentricity. The straight line (GQH), drawn through the center and terminated both ways by the curve, is called the diameter. AC is the major axis and BD the minor axis.

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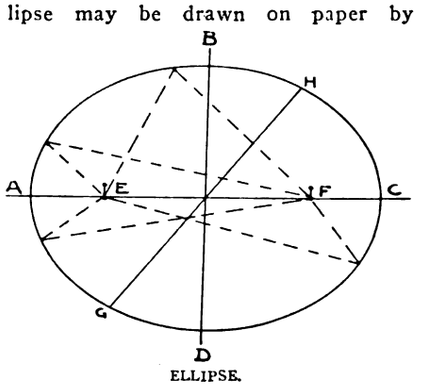
Practically, a tolerably accurate ellipse may be drawn on paper by



ELLIPSE.

sticking two pins into it to represent the foci, putting over these a bit of thread knotted together at the ends, inserting a pencil in the loop, and pulling the sheet tight as the figure is described. The dotted lines in the diagram represent the thread and their intersection with the circumference the point of the pencil.

The importance of the ellipse arises from the fact that the planets move in elliptical orbits, the sun being in one of the foci—a fact which Kepler was the first to discover.

The area of an ellipse is found as follows:

Rule.—Multiply half of the two axis together; and multiply that product by 3.1416.

Example.—What is the area of an ellipse whose major axis is 20 in. and minor axis 16 in. Ans. 251.328 square in.

Half of 20 is 10; half of 16 is 8; 8 × 10 equals 80; 3.1416 × 80 equals 251.328.

To draw an ellipse of given dimensions: To describe an ellipse in a rectangle 8 by 10 in., or the major diameter is 10 in. and the minor diameter is 8 in. The difference between the squares of 10 and 8 is the square of 6—the difference between the foci (pins). This added to the greater diameter gives the entire length of string to be used—16 in. Tie a string so that it will, when expanded, to be 16 in. around. Set the pins within it, 6 in. apart and with the point of a pencil draw it tight and thus describe your "oval." The square of 10 is 100; the square of 8 is 64 and 64 from 100 equals 36 and the square of 36 is 6.

The above ratios are constant for all sizes and proportions of ellipse. Any two being given, the third may easily be found, and the loop is half the length of the sum of the greater diameter and the focal distance. Focal distance is the distance between foci.

LAKE LAUNCHING.

The steamer Wm. H. Truesdale, named in honor of the president of the Lackawanna Railroad, was launched for the Empire Ship Building Co., of Buffalo, at the Lorain yard of the American Ship Building Co. on Saturday last. This steamer, which is an exact duplicate of the J. J. H. Brown, launched a month ago, will be managed in the office of Brown & Co., of Buffalo. The steamer was christened by Miss Jessie Steele, niece of Mr. Truesdale.

The launching party were taken to Lorain on special cars and at the successful conclusion of the event returned to the Union Club at Cleveland, for luncheon. In the party were: Mr. and Mrs. Wm. H. Truesdale, H. Loomis, Mrs. H. Ogle, of New York; W. M. Mills, of Tonawanda; Capt. J. J. H. Brown. Mr. and Mrs. Harvey L. Brown and John Connelly, of Buffalo; Mr. and Mrs. Ralph Mitchell, Capt. W. C. Richardson, J. T. Kelley, W. A. Hawgood and Capt. James Owen, of Cleveland. R. C. Wetmore, vice president of the American Ship Building Co., acted as host.

The dimensions of the Truesdale are: 452 ft. over all, 432 ft. keel, 52 ft. beam and 28 ft. deep. She has 23 hatches spaced 12 ft. centers. Her engines will be triple-expansion with cylinders 22, 35, 58 in. diameter by 42-in. stroke, supplied with steam from Scotch boilers, 13 ft. 9 in. by 11 ft. 6 in., equipped with Ellis & Eaves draft, and allowed a working pressure of 170 lbs. She will carry 9,000 gross tons of cargo.

Capt. George C. Stevenson will sail the steamer and George Bartley will be her chief engineer.

The steamer Harry A. Berwind, building for the Mutual Steamship Co., of Duluth, which was organized by G. A. Tomlinson, was launched from the Ecorse yard of the Great Lakes Engineering Works on Saturday last and was christened by Miss Ruth Hartwell, of Chicago. Immediately after leaving the ways the steamer was towed to the shear dock and within 30 minutes thereafter both of her boilers were in position.

The Berwind is 557 ft. over all, 532 ft. keel, 58 ft. beam and 31 ft. deep. She has 30 hatches spaced 12 ft. centers. Her engines are triple-expansion with cylinders 24, 38 and 65 in. by 42-in. stroke, supplied with steam from Scotch boilers, 16 ft. by 11 ft. 8 in., fitted with Great Lakes draft and allowed 180 lbs. pressure. Carrying capacity 10,500 gross tons.

Capt. C. C. Tousley will bring her out and Robert J. Close will be her chief engineer.

Attending the launching of the Berwind were: Mr. and Mrs. G. A. Tomlinson, of Duluth; Miss Hartwell and F. G. Hartwell, from Chicago; Mr. and Mrs. J. A. Davidson, of Bay City, Mich.; Frank Masten, of Cleveland; Mr. and Mrs. Mauck, of Hillsdale; Mrs. Worthington, Mr. and Mrs. Louis Gascoigne, Mr. and Mrs. George Lane, Mr. and Mrs. Newman, Mrs. N. H. Farr, Mrs. Collins, Major Charles Kellar, Capt. C. H. Westcott, Capt. A. E. Stewart, H. C. Potter Jr., Frank W. Fletcher, Mr. and Mrs. Antonio C. Pessano, Mr. and Mrs. H. W. Hoyt, John R. Russel, Miss Helen Pessano, Miss Hoyt, Miss Frances Russel, Miss Marjorie Russel, and Miss Katherine Anderson of Detroit.

PIG IRON SITUATION.

If only a portion of the plate and structural tonnage that is being figured on, especially in the east, develops into orders, the active capacity in these lines will be considerably increased. A Long Island water project requiring 20,000 tons of plates, an addition to an eastern hotel calling for 4,000 tons, 2,000 tons for a Detroit skyscraper addition, 1,700 tons for bridges at Milwaukee and Omaha, 4,200 tons for a plant in the Chicago district, and 16,000 tons for the Reading track elevation at Philadelphia are some of these probabilities.

The Eastern Pig Iron Association has again decided to make no change in quotation, and if necessary, stacks will be blown out to maintain consumption and production on a level. Eastern bar iron interests have also decided against change of prices.

Increased activity is noted in sheets, tin plate and wire products, the principal interest operating 75 per cent of its tin plate capacity. Pig iron purchased by diversified foundry interests in the east has given the market more activity. In the central west, concessions from the agreed price of $17 are reported, valley furnaces quoting No. 2 foundry at $15.60. For spot iron, southern operators are asking $12 for No. 2, but are holding at $13 for second half.

Coke is still quoted at $1.75, although some interests claim to be able to purchase at $1.60.

The Falls Hollow Staybolt Co., Cuyahoga Falls, O., has received a large order for Falls hollow staybolt iron to be used in certain locomotives now being built by the American Locomotive Co. for the Paris & Orleans Railway of France.

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GRAIN BILL OF LADING.

In the absence of President Wm. Livingstone, of the Lake Carriers' Association, J. H. Sheadle, vice president, called a meeting of the association at his office Thursday to consider changes in the present grain bill of lading as suggested by certain bankers in the northwest and to prepare a general statement from the vessel owner's standpoint to be submitted at a general meeting of vessel owners, shippers and bankers which will be held in Buffalo on Friday. Vesselmen in general are not concerned in the bill of lading except that they are willing to do anything within reason to facilitate commerce on the lakes. The subject, however, is of considerable importance to shippers of grain and to bankers who make advances against bills of lading. The position of the bankers is set forth in the following announcement to shippers of grain:

"The undersigned banks located in Chicago hereby give notice that on and after April 15, 1908, they will refuse to make advances against bills of lading which, though issued to order and naming a consignee at the point of destination, also indicate an agent to whom the grain may be delivered for trans-shipment or other purpose at some intermediate point. Such bills have been in common use in cases where grain is carried by water as far as Buffalo and there shifted into cars for the remainder of the route. They are also in use in certain cases where, though the entire route is by rail, intermediate transshipments are contemplated.

"The objectionable bill is in the usual 'order' form with a direction to 'notify' the consignee in 'care' of a designated agent at Buffalo or other intermediate point. In practice the lake or other initial carrier delivers the grain to this agent without requiring the surrender of the bill of lading.

"As this agent is not the representative of the holder of the bill of lading, but represents either the shipper or the consignee, it is evident that the holder of the bill is deprived of his security by this intermediate transaction without his consent or knowledge, while the grain is still in transit and his advances remain unpaid.

"Such bills cannot be considered as furnishing reasonable security for advances, and therefore they will, after the date above mentioned, be accepted by the undersigned for collection only."

ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

413. In the fore-peak at the foot of collision bulkhead. The valve stems are run up so that they can be handled from the chain locker.

414. Through manholes in lower part of collision bulkhead.

415. They are usually marked under the main deck directly over the manholes.

416. Secure the rudder by lashing the tiller and with relieving tackles secure it amidships.

417. Work them slowly for a few minutes to get the water out of the cylinders and see that everything is in working order.

418. 17 fathoms or about 100 feet.

419. A properly secured life-line the entire length on each side, such line to be festooned with a seine float in each bight, the bights to be not longer than 3 ft.; one boat painter of not less than 2¼-in. manilla rope, properly attached and of suitable length; a full complement of oars and two spare oars of suitable length; not less than four rowlocks and two spare ones, all attached to the boat. One steering oar with rowlock or becket, or one rudder with yoke and yoke ropes; one boat hook; one bucket with lanyard attached; two life preservers and on wooden boats two plugs for each drain hole attached with lanyard or chain.

420. To see that everything required is in its place and properly secured, that boat falls are coiled away clear for running and that the boat covers are secured in such a way that they can be taken off in the least possible time.

421. 1 whistle or 1 bell—Go ahead.
1 whistle or 1 bell—Stop.
2 whistles or 2 bells—Back.
3 whistles or 3 bells—Check.
4 whistles or 4 bells—Strong.
4 whistles or 4 bells—All right.

Two whistles or two bells shall always mean back, irrespective of other signals given.

422. A form signed by the local inspectors who last inspected the boat, certifying that she is within the requirements of the law as to seaworthiness, equipments, etc.

423. A box or large pipe running maindeck to within a few inches of cargo hold floor. In case of wrecking operations it can be used for the suction pipe of a steam pump.

Quite a number of large steamers have loaded coal at Buffalo to sail at owners' option.

QUESTIONS FOR WHEELSMEN AND WATCHMEN.

434. What is a cross signal?

435. When would you deem a cross signal safely to be used?

436. What is a danger signal?

437. What is an alarm signal?

438. What is a distress signal?

439. What are the helm signals?

440. What does one blast of the large whistle mean?

441. What signal would you blow if you wanted to direct your course to port?

442. Which way would you put your helm?

443. Which side light would you show under the same circumstances?

QUESTIONS FOR MASTERS AND MATES.—NO. 63.

812. A ship from Lat. 49° 58′ N, sails the following courses: S x W 42 miles, WSW 36 miles, W 18 miles, ESE 22 miles, S 34 miles, and NE 21 miles. What is the latitude arrived at and the course and distance made good?

813. What is a traverse or compound course?

814. What is parallel sailing?

815. A ship in Lat. 36° 58′ N, Long. 20° 25′ W, is bound to a port in Lat. 36° 58′ N, Long. 25° 13′ W, what distance must she run to arrive there and what course would she steer? Dev. for ship's head 8° Ely. Mean Var. on course 6° Wly.

816. A ship sails due east 156 miles and finds she has altered her longitude 314′, what parallel of latitude has she sailed on?

817. What do you understand by middle latitude sailing?

818. A ship in Lat. 37° 3′ N, Long. 23° 18′ W, is bound for a port in Lat. 32° 18′ N, Long. 31° 13′ W. What is her true course and distance to be covered?

819. Supposing the Var. at start is 10° Ely, at destination 18° Wly, and Dev. for ship's head SW is 6° Ely and 8° Ely for WSW, what compass course would she steer?

820. At what rate per hour in statute miles is a spot in Lat. 51° 28′ 38″ S carried round the earth's axis?

821. Two ships in Lat. 50° 18′ N are apart 256 miles, they both sail due south until their distance apart is 356 miles. What parallel of latitude are they on and how many miles south have they sailed?

The steamer Maruba of the Pittsburg Steamship Co.'s fleet was transferred from Ashtabula to Lorain this week for repairs.

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WORK ON IRON RANGES.

The normal winter season on the iron ranges of the Lake Superior district will end in another month. Almost every branch of mining activity is in marked contrast to the operations of this time a year ago, the venturing out of ore boats here and there with the first clearing up of the ice, the picturesque fleet held back by the frozen canal at the Soo, the exciting race up Lake Superior for berths at the docks and similar scenes of eagerness to begin the season's shipping at the earliest possible moment will be entirely lacking.

The situation at present shows the majority of the underground mines of the independent operators, Pickands, Mather & Co., Republic Iron & Steel Co., Jones & Laughlin, Cleveland Cliffs Iron Co., Pittsburg Iron Ore Co., Biwabik Mining Co., Corrigan, McKinney & Co., Buffalo & Susquehanna Mining Co., and the several other smaller interests, to be operating at less than 50 per cent of full capacity. Corrigan, McKinney & Co. have perhaps suspended work almost completely and the Menominee range group of this company at Crystal Falls is nearly idle with some of the properties absolutely so. The Cleveland Cliffs Iron Co. has a considerable amount of development work on its hands, particularly in the Swanzey district, and it is pushing this at practically a normal rate. The forces at its shipping mines have probably been reduced in the neighborhood of 45 per cent, which is a smaller reduction than is generally true.

Many considerations are involved in the relative activity of the various properties which a company may operate. Where only underground mines are to be considered the quality of the ore, the pumping charges, the length of the lease, the size of minimums and the labor organization all enter into the problem as well as the general question of how much shall will be true because the ore of the highest grade, which at the same time can be mined most cheaply, will be the one most in demand during a period of enforced low iron and steel making costs. In addition, the minimums on the open pit mines are generally larger and lease terms are shorter. This is true not only because of the character of the mine which permits a more rapid development but because the tendency has been in the direction of larger minimums and the Mesabi, being the newest of the ranges, has felt it most.

THE CORPORATION'S POLICY.

The policy of the Steel Corporation is not essentially different than those of other companies. Its activity is accentuated, however, by the fact that it controls by a great majority the open pits of the Mesabi and has abated but little the winter's work of stripping. This may not mean necessarily that the mining of ore from the pits during the summer will be in the same proportion to the work of last summer as the winter's stripping is to that of a year ago because it has always been true that the winter before a busy season afforded too little time for adequate stripping and the mining of the summer has always been handicapped thereby. The same amount of stripping and more moderate mining will result in economies during the shipping months and better grading of the ore. The operations at the underground properties of the Steel Corporation have been cut down one-half and will undoubtedly remain so as long as present conditions continue. The fact that so large a part of the iron made is for steel making purposes and that the ore for this comes so largely from the open pits of the Mesabi points clearly to a preponderance of shipments from Minnesota.

The stripping work under progress for the Oliver Iron Mining Co. is being continued with few changes in the program of last year as regards the mines being developed. At Coleraine and Hibbing, work is going on actively and new stripping contracts covering millions of yards have been made where existing contracts were worked out. This contract work was suspended, however, at the completion of the old contracts, a circumstance to be attributed to the weather, which is most severe in the first three months of the year, more than to any other possible reason, for even in the urgency of last winter the contractors were almost entirely idle for a time, as is customary. Where the mining company is doing its own stripping, as at the Hull-Rust and Sellers, there has been no stoppage. The pits temporarily affected by the ending of contract work were the Morris, Burt and Monroe Tener in the Hibbing-Chisholm district.

STRIPPING OPERATIONS.

Among the independently operated open pits, the Mahoning and Shenango mines are being stripped aggressively; the Stevenson, being stripped by Drake & Stratton, is practically idle and the Biwabik mine is doing but little. The stripping of the Susquehanna mine is still in the future. Figures have also been asked for the stripping of the Sliver property at Virginia under lease to M. A Hanna & Co., and for a further opening up of

A direct denial has been made of the report that Jones & Laughlin have let the contract for stripping the Grant mine with steam shovels. As the letting of such a contract would indicate the abandonment of the clam-shell grab stripping device, the work of which has been the object of much interest and criticism, these reports have been widely circulated. We understand that even a probable resorting to steam shovels is not conceded by the Interstate Iron Co. and much less is it true that a contract for steam shovel stripping already exists.

REPORTED DISCOVERIES.

The fact that there has been more or less drilling in this immediate neighborhood, on the old Ajax property and around the Biwabik mine and probably some final testing of the Cass property before leaving it may have given rise to the report or have shown up the ore if it is actually there. The Pearce mine is understood to have further increased the quantity of its ore in sight by deeper drilling and a new shaft is in process of construction. The Longyear exploration on the east shore of Embarrass lake, upon which drills have been working since the summer of 1906 and which has been estimated to be a deposit of several million tons of good ore, will be further tested for difficulties in shaft sinking. The experience with the Bangor and Syracuse mines on the other side of the lake, perhaps a mile away, may not be encountered here, but a different situation seems unlikely. The work at Bangor and Syracuse is being actively pursued.

Drilling and exploratory work, with the exception of that being prosecuted in the Swanzey district by the Cleveland Cliffs Iron Co. and the Steel Corporation, is pretty much at a standstill. In the Crystal Falls and Iron River districts of the Menominee range a few drills remain, but reductions have been made wherever possible. On the Gogebic, the Steel Corporation has just completed the steel shaft house for the Tilden mine, the intended erection of which was mentioned in these columns last summer. With the development of the Colby-Tilden deposit is interwoven a great deal of interesting iron ore history and the decision of

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the president of the Corporation's mining company to take this latest step was characteristically expressed in his remark, "That ore must be down there and we are going to give you the right kind of equipment to get it."

O. J. A.

ATLANTIC COAST GOSSIP.

Office of the MARINE REVIEW, Room 1005, No. 90 West St., New York City.

General Manager Edward O. Thomas, of the New York & Continental Line, has announced the completed plans for the company's new passenger service between New York, Hamburg, Rotterdam and Halifax, to begin from New York on April 11 with the sailing of the Vulturno. There will be three vessels in the service, the Vulturno, Avoca and Jelunga, each boat having accommodation for 1,400 steerage, 80 first class and 150 second class passengers. C. B. Richard & Co. have been appointed general agents of the line.

The New York & Continental Line began a freight service to the ports mentioned in February, 1907, it being announced then that passenger vessels would be put on later.

The North German Lloyd liner Kronprinz Wilhelm sailed as scheduled on Tuesday, repairs having been completed where the vessel was damaged in collision with the freight steamer Crown of Castile in the fog-bound harbor of New York, Wednesday of last week.

A review of the casualties of the coast of New England and British North America during the fall and winter seasons just ended shows that about 350 lives were lost. Of this number 251 persons perished in the wrecks of 10 vessels of the French fishing fleet of St. Pierre, Miquelon, last fall. Fourteen men were lost through the Phoenix liner St. Cuthbert disaster, and many individual lives during the gales that have swept the coasts.

A Sailor's Home is about to be constructed in New York City. According to specifications it will be a 12-story building, and will be equipped with all that pertains to the comfort of the sailor and officer during the stay in port. There will be sleeping accommodation for 400 of the former and 100 of the latter. The building will have a quaint lantern-like tower, which will be used to display vari-colored lights as a code of signals for the institute. The signals will be seen far out in the harbor.

The old cruiser Newark, built by the Wm. Cramp & Sons Co., of Philadelphia, in 1890, is to be fitted out for a station and store ship at Guantanamo, to take the place of the Monongahela, recently burned. She is one of the oldest vessels of the new navy and is practically obsolete as a warship, being an unarmored steel cruiser of the second class.

The Monongahela was built as a sloop of war at League Island navy yard and took a prominent part in the operations on the Mississippi during the civil war, at various times being commanded by Lieutenant George Dewey and Lieutenant Winfield Scott Schley. Following the war she was used as a training ship for midshipmen and apprentices, for the past few years being used as store ship at Guantanamo.

A dining room for the use of immigrants is now in operation on Ellis island, New York, which is believed to be one of the largest in the world. There is a seating capacity of 1,500, this being three times as great as the seating capacity in the past.

During the year 1907 there was an average of 1,473 immigrants on the island daily.

The sloop Guillermito picked up off Fajardo, Porto Rico, a derelict vessel named the Sea Hawk, laden with cigars, liquors and a general cargo. A dead dog was on the vessel. The Guillermito towed the derelict to Arroyo. The Sea Hawk is not an American vessel.

The United States cruiser Chicago, bound from the Pacific coast to Hampton Roads, entered the outer harbor of Pernambuco on Friday, having in tow the disabled Austrian steamship Robina, from Hull for Buenos Ayres. After anchoring the Robina she saluted the fort and again put to sea.

The steamer Beacon Light, formerly in the trans-Atlantic oil trade, left Havana on March 18 for Philadelphia with a cargo of Cuban molasses in bulk.

The steamship Iroquois, the only twin-screw tank ship in the world, arrived at New York last Friday towing the mammoth barge Navahoe. Each vessel is the largest of its class afloat, and together can carry 20,000 tons of oil. The barge is constructed along lines similar to the steamship, and will be towed by the latter on every trip across the Atlantic. Their outward cargoes will be over 5,000,000 gallons of oil.

CHICAGO HARBOR.

The harbor commission appointed by Mayor Busse to consider the development of Chicago harbor met last week and listened to a paper prepared by Henry W. Lee, who advocated a land-locked harbor for Chicago by the development of Lake Calumet in conjunction with the Calumet river. Concerning this project Mr. Lee said:

"The Calumet river runs five miles from Lake Michigan southwesterly in an unusually straight course to the forks at the Lake Calumet cut-off at 128th street. For nearly all of this distance it is 200 ft. wide. The federal government has appropriated money and is now engaged in the work of making uniform this width, 200 ft., and depth 21 ft. throughout.

"In 1889 the tonnage of the port of the Calumet river was 753,599. In 1907 it was 6,337,774, over eight-fold increase. During the same 18-year period the commerce of the Chicago river has been virtually at a standstill, showing that the downtown river has attained its full capacity.

"In a recent address to this commission Col. Bixby demonstrated the difficulties of navigation in the Chicago river because of its narrow stream and sinuous course. He showed that the widening of the Chicago river would entail such a tremendous cost that it is hardly to be considered.

"It is estimated that dredging a canal 21 ft. deep from the Calumet river to the lake north of 110th street would cost $215,111. Dredging Lake Calumet for a harbor would cost $3,097,600 per square mile, or approximately $9,292,800 for dredging the entire lake to a depth of 21 ft. The entire project, canal and harbor, will cost $9,507,911 in the aggregate.

"The shipping facilities of the Calumet district are by no means confined to the lake and river. All the eastern through lines run through South Chicago and all the other roads have connection by means of the Belt railroads.

"Col. Bixby has told you that the best route from the Great Lakes to the gulf will be via Calumet river and the Sag channel to the main drainage canal. I mention it at this time because without it no discussion of the navigation of the Calumet region would be complete and the much-discussed lakes-to-the-gulf waterway would be impossible. It will complete a navigable belt around Chicago."

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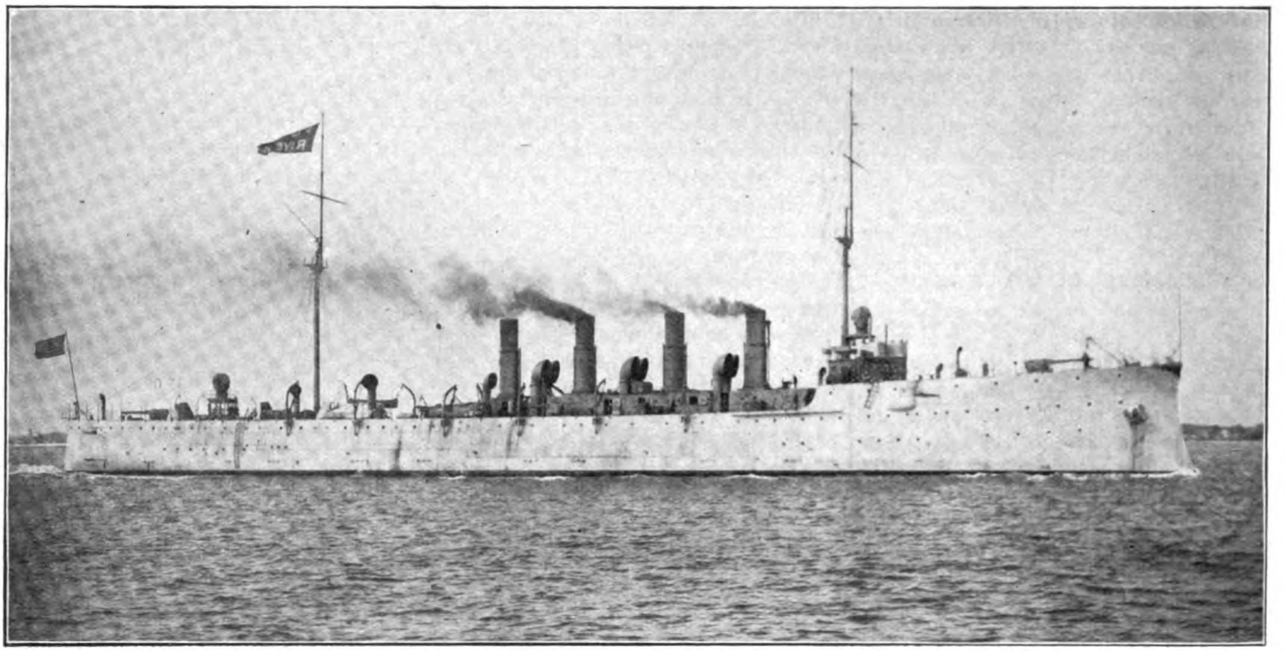

SCOUT CRUISER BIRMINGHAM.

SCOUT CRUISER BIRMINGHAM.

The scout cruiser Birmingham underwent her standardization trials on Wednesday, March 11, on the mile course at Rockland, Me., developing a top speed of 25.33 knots and an average for five high runs of 25.49 knots. The highest revolutions were 205 and the curve showed that 187.23 R. P. M. would give a true speed of 24 knots per hour. On Thursday, March 12, the vessel got under way early and successfully completed the four-hour full speed endurance run, the engines making 191.66 R. P. M., giving a resulting speed of 24.32 knots. The vessel returned to Boston on completion of this run, and on Friday, March 13, the 24-hour 12-knot endurance run was successfully made, followed on Saturday by the 24-hour endurance run at 22½-knot speed.

Herewith are published two tables, one giving the results of the three trials, and the other a comparison of the Birmingham and Chester.

TRIAL RESULTS.

		Birmingham.	Chester.
4 hr.	Speed.....	24.32	26.5
Full	R. P. M.....	191.66	....
Speed	Total coal, tons..	53.50	68.5
24 hr.	Speed.....	12.228	12.2
12 knot	R. P. M.....	91.334	....
	Total coal, tons..	49.59	43.9
24 hr.	Speed.....	22.665	22.8
22½	R. P. M.....	172.101	....
Knot	Total coal, tons..	219.70	193.6

The Birmingham, built by the Fore River Ship Building Co., Quincy, Mass., is equipped with reciprocating engines; the Chester, built by the Bath Iron Works, Bath, Me., is equipped with Parsons turbines.

The trials of the Birmingham were completed without accident, except in the 24-hour 22½-knot run. One of the blowers in the middle fire-room broke a crank shaft after two hours' running. The trial was completed with this blower out of commission. This undoubtedly had effect on the coal consumption, as it was difficult to maintain steam in the boilers in this compartment during the balance of the run. The Birmingham returned to the works at Quincy on Monday, March 16. She will be completed and delivered to the navy yard in Boston in about two weeks.

ANCHOR LINE APPOINTMENTS.

James C. Evans, western manager of the Anchor line, yesterday announced the appointments of masters to vessels of that company's fleet for the season of 1908. There are few changes from last year. Capt. Hugh Miller wil go in the Wissahickon, the flagship of the fleet. Capt. Miller succeeds the late Capt. Charles Christy, who brought the Wissahickon out last year. Capts. Edward Martin and John Doherty, two of the best known masters of passenger boats on the great lakes, will sail the big sister ships Juniata and Tionesta. The appointments follow:

Steamer.	Captain.
Juniata	Edward Martin
Tionesta	John Doherty
Japan	Henry Cronkhite
Wissahickon	Hugh Miller
Delaware	Charles Nelson
Muncy	A. McKenzie
Codorus	L. Wright
Mahoning	Charles Delaney
Schuylkill	Joseph Corcoran
Susquehanna	J. McDonald
Lehigh	Frank Bloom
Clarion	Thomas J. Bell
Lackawanna	M. Boggan
Scranton	H. W. Stewart
Alaska	J. J. Lehan

Joseph Donahue has been reappointed first mate of the Juniata and J. P. Grant of the Tionesta. D. D. McLeod will be Capt. Cronkhite's chief officer on the Japan. E. L. Hazard, one of the veteran empoyes of the Anchor line and well known to lake travelers, will be purser of the Juniata, and F. W. Service will act in that capacity on the Tionesta.

Secretary Wm. Penje of the Seamen's Union has appointed the following agents at various lake ports: Tonawanda, Thomas Lester; Milwaukee, Fred Huehns; Toledo, Gus Peterson; Cleveland, Wm. Curry; Ashtabula, Thomas McCoy; Conneaut, Wm. H. Jenkins; Buffalo, George Hanson.

Mr. Charles Hallam Keep, formerly secretary of the Lake Carriers' Association, but latterly connected with the treasury department at Washington, has been appointed president of the Knickerbocker Trust Co. of New York.

U. S. S. BIRMINGHAM.

Trial—	I. H. P.	Coal per hour, lbs.	Coal per I. H. P. per hr.	Speed.	Knots per ton coal.
Four hours	15,500	29,904	1.93	24.325	1.365
Twenty-four hours @ 22½ knots.	10,770	20,510	1.90	22.665	2.475
Twenty-four hours @ 12 knots...	1,600	4,629	2.89	12.228	5.965

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IMPROVING HARBOR AT ALGOMA, WISCONSIN.

Abstract of proposals for building concrete caisson breakwater, pile pier, removing old pier, and dredging at Algoma Harbor, Wis., received and opened Feb. 24, 1908, at Milwaukee, Wis., by Major W. V. Judson, Corps of Engineers.

	1. Thomas H. Smith, Sturgeon Bay, Wis.	2. Great Lakes Dredge & Dock Co., Chicago, Ill.	3. Adolph Green, Green Bay, Wis.	4. Greiling Bros., Green Bay, Wis.
Part First—Reinforced Concrete Caisson Breakwater:				
1,045 cu. yds. No. 1 concrete, per cu. yd	$ 20.50	$ 22.00	$ 15.50	$ 20.00
400 cu. yds. No. 2 concrete, per cu. yd	9.50	9.50	12.50	18.00
800 cu. yds. No. 3 concrete, per cu. yd	9.00	5.90	9.80	15.00
65,000 ft. B. M. timber, per M. ft. B. M	40.00	50.00	60.00	65.00
Driving, cutting off, etc., 360 foundation piles, furnished by U. S., per pile	12.00	19.00	6.75	6.00
10,000 lbs. wrought iron or steel bolts and spikes, per lb	.05	.05½	.05	.05
360 cast iron bearing plates, per plate	1.00	2.50	4.00	3.00
6,200 tons stone, per ton of 2,000 lbs	1.60	1.60	1.50	1.40
Total	$50,122.50	$52,970.00	$46,607.50	$56,745.00
Part Second: Pile Pier, Plank Cribs, Removing Old Pier and Dredging—				
Driving round piles, furnished by U. S., 11,000 lin. ft., per lin. ft	.....	.20	.20	.15
Making and driving 261,000 ft. B. M. sheet piles, plank furnished by U. S., per M. ft. B. M	.....	15.00	35.00	18.00
Framing 116,000 ft. B. M. timber and plank, furnished by U. S., for pile pier, per M. ft. B. M	.....	20.00	28.00	20.00
Framing 77,000 ft. B. M. plank, furnished by U. S., for plank cribs, per M. ft. B. M	.....	13.00	48.00	22.00
31,000 lbs. wrought iron or steel screw bolts and tie-rods, per pound	.....	.05	.05	.05
3,600 lbs. wrought iron or steel drift bolts, per pound	.....	.05	.04	.05
9,000 lbs. wrought iron and wire spikes, per pound	.....	.05	.05	.05
9,300 tons stone, per ton of 2,000 pounds	.....	1.60	1.50	1.40
Removing 650 lin. ft. Old Pier, per lin. ft	.....	18.00	16.00	15.00
Dredging 100,000 cubic yards, per cubic yard	.....	.29	.19	.12
Total		$67,196.00	$63,773.00	$47,312.00
Total for entire work	.....	$120,166.00	$110,380.50	$104,057.00

All bids rejected as being too high and in excess of amount available for the work. Recommended that work be done by the United States by hire of labor and use of United States plant.

REPAIRING PIER AT CHARLEVOIX.

Abstract of bids for repair of South Pier at Charlevoix, Mich., received and opened March 5, 1908, in accordance with advertisement dated Feb. 4, 1908, by Colonel M. B. Adams, Corps of Engineers.

To furnish the following material and to secure it in the work.

No.	Name and address of bidder.	1. Cutting down and removing old work 195 lin. ft. Per lin. ft.	2. Oak Piles. 2,168 lin. ft. Per lin. ft.	3. Oak Timber. 2,120 ft. B. M. Per M ft. B. M.	4. Pine or Douglas Fir Timber. 28,221 ft. B. M. Per M ft. B. M.	5. Pine or Douglas Fir Plank for Sheet Piles. 42,108 ft. B. M. Per M ft. B. M.	6. Pine or Douglas Fir Plank for Decking. 1,728 ft. B. M. Per M ft. B. M.	7. Drift Bolts. 3,450 lbs. Per lb.	8. Screw Bolts. 1,690 lbs. Per lb.	9. Carriage Bolts. 1,300 lbs. Per lb.	10. Tie Rods. 1,778 lbs. Per lb.	11. Spikes. 140 lbs. Per lb.	Approximate Total.
1.	Burk, Smith & Nelson, Muskegon, Mich	$ 2.00	33c	$60.00	$42.00	$45.00	$40.00	4c	4c	4c	4c	4c	$4,716.22
2.	Nelson J. Gaylord, Ludington, Mich	2.00	35c	60.00	40.50	45.00	38.00	4c	4c	5c	4c	4c	4,726.79
3.	Robert Love, Muskegon, Mich	2.50	50c	70.00	46.00	60.00	45.00	5c	5c	5c	5c	5c	6,040.21
4.	L. G. Smith & Co., Muskegon, Mich	4.90	45c	65.00	49.00	60.00	45.00	4½c	4½c	4½c	4½c	4½c	6,432.07
5.	Columbian Construction Co, Muskegon, Mich.	12.00	40.00	80.00	50.00	50.00	50.00	5c	6c	6c	6c	6c	7,446.63

TRINITY RIVER LOCK AND DAM.

Abstract of proposals for constructing lock and dam No. 4, Trinity river, Texas, received in response to advertisement dated Oct. 7, 1907, and opened Dec. 18, 1907, by Capt. W. P. Wooten, corps of engineers, U. S. army, at Dallas, Tex.:

			—Names of bidders— Ball-Carden Co., Dallas, Tex.		Midland Bridge Co., Kansas City, Mo.	
Classification—	Unit.	Approx. Quantities.	Unit Price.	Amount.	Unit Price.	Amount.
Grubbing and clearing	Acres.	3	$290.00	$ 870.00	$150.00	$ 450.00
Excavation	Cu. Yds.	26,000	0.40	10,400.00	2.00	52,000.00
Round timber	Lin. Ft.	1,400	0.32	448.00	0.50	700.00
Round piles	Lin. Ft.	44,000	0.50	22,000.00	0.70	30,800.00
Brush	Cords.	5	50.00	250.00	5.00	25.00
Concrete	Cu. Yds.	5,660	7.00	39,620.00	14.00	79,240.00
Boule gates	Ft. B. M.	5,200	50.00	260.00	100.00	520.00
Oak timber	Ft. B. M.	50	0.10	5.00	75.00	3,750.00
Timber in permanent work	Ft. B. M.	44,000	50.00	2,200.00	70.00	3,080.00
Timber in cribs	Ft. B. M.	28,000	50.00	1,400.00	55.00	1,540.00
Riprap	Cu. Yds.	1,600	4.69	7,504.00	7.00	11,200.00
Iron and steel	Lbs.	138,600	0.0624	8,648.64	0.09	12,474.00
Steel reinforcing rods	Lbs.	52,700	0.0574	3,024.98	0.045	2,371.50
Chain	Lbs.	5,626	0.0995	559.79	0.12	675.12
Drift bolts	Lbs.	1,200	0.05	60.00	0.05	60.00
Sheet piling	Ft. B. M.	225,000	50.75	11,418.75	55.00	12,375.00
Sheet piling, steel	Sq. Ft.	2,160	1.75	3,780.00	2.10	4,536.00
Plain filling	Cu. Yds.	3,800	0.30	1,140.00	0.35	1,330.00
Compacted filling	Cu. Yds.	1,500	0.40	600.00	0.60	900.00
Riprap paving	Sq. Ft.	5,500	0.40	2,200.00	0.35	1,925.00
Paving on spoils	Sq. Ft.	4,820	0.40	1,928.00	0.40	1,928.00
Paving in concrete	Sq. Ft.	1,570	0.40	628.00	0.50	785.00
Paving for cribs	Sq. Ft.	410	0.25	102.50	0.35	143.50
Sand bags	Each.	3,000	0.10	300.00	1.00	3,000.00
Gauges	Lin. Ft.	53½	2.50	133.75	5.00	267.50
Grab, Crane and Service Car	Lbs.	2,550	0.25	637.50	0.15	382.50
Frames with rollers	Each.	290	7.00	2,030.00	20.00	5,800.00
Drains under lock floor	Lin. Ft.	580	0.50	290.00	0.50	290.00
Timber in cofferdam	Ft. B. M.	78,000	50.00	3,900.00	50.00	3,900.00
				$126,338.91		$236,448.12

Award authorized to Ball-Carden Co., lowest bidder.

BIDS ON CANAL CIRCULAR 418.

Bids received by the general purchasing officer of the Isthmian Canal Commission, Washington, D. C., Feb. 17, for material and supplies for the Panama canal, included the following:

Class 6—2,600 lbs. Rubber Sheet Packing.

Crandall Packing Co., 136 Liberty St., New York	$1,326.00
Double Service Packing Co., Inc., 430 Walnut St., Philadelphia, Pa	1,040 00
Fox Bros. & Co., 126 Lafayette St., New York	1,625.50
	1,508.00
	1,404.00
Garlock Packing Co., 136 Liberty St., New York	1,170.00
Gutta Percha & Rubber Mfg. Co., 126 Duane St., New York	1,252.00
Jenkins Bros., 71 John St., New York	1,105.00
New York Belting & Packing Co., 91 Chambers St, New York	1,430.00
Quaker City Rubber Co., 629 Market St., Philadelphia, Pa	1,950.00
Republic Rubber Co., 47 Warren St., New York	1,274.00
William G. Stevenson, 110 Race St., Philadelphia, Pa	1,248.00
Mechanical Rubber Co., Cleveland, O.	2,860 00
	1,404.00
Trenton Rubber Mfg. Co., 2 Rector st., New York	728.00
United & Globe Rubber Mfg. Co., Trenton, N. J.	1,352 00

Class 7—1,100 Lbs. Rubber Sheet Packing.

Crandall Packing Co., 136 Liberty st., New York	$ 396.00
Double Service Packing Co., 430 Walnut St., Philadelphia, Pa	404 25
Fox Bros. & Co., 126 Lafayette St., New York	605 00
	550 00
	495.00
Garlock Packing Co., 136 Liberty St., New York	412.50

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Abstract of proposals for construction of cofferdam and lock walls at Black Rock Harbor, Buffalo, N. Y., received in response of advertisement dated Jan. 14, and opened March 14, 1908, by Lieut. Col. W. L. Fisk, Corps of Engineers, at Buffalo, N. Y.

Items.	Names and Addresses of Bidders. 1. Great Lakes Dredge & Dock Co., Chicago, Ill. Unit price.	1. Total.	2. Buffalo Dredging Co., Buffalo, N. Y. Unit price.	2. Total.	3. The Foundation Co., New York City. Unit price.	3. Total.	4. T. A. Gillespie Co., New York City. Unit price.	4. Total.	5. Reed & Coddington Engr. Co., Niagara Falls, N. Y. Unit price.	5. Total.	6. McArthur Bros. Co. 11 Pine St., N. Y. City. Unit price.	6. Total.
Cofferdam—												
Steel sheet piling, 6,910 tons, @	$ 56.00	$386,960.00	55.00	$380,050.00	$ 52.40	$362,084.00	$ 62.00	$ 428,420.00	$ 70.00	$ 483,700.00	$ 53.00	$366,230.00
Steel waling and braces, 192,000 lbs. @	.06	11,520.00	.07	13,440.00	.08	15,360.00	.03½	6,720.00	.10	19,200.00	.05	9,600.00
Clay filling, 40,000 cu. yds. @	.90	36,000.00	.65	26,000.00	1.00	40,000.00	.50	20,000.00	.85	34,000.00	.45	18,000.00
Clay banking, 20,000 cu. yds. @	.40	8,000.00	.65	13,000.00	.82	16,400.00	.50	10,000.00	.50	10,000.00	.35	7,000.00
Pumping out and maintenance (lump sum bid)		50,000.00		35,000.00		42,648.00		30,000.00		45,000.00		8,000.00
Total for Cofferdam		492,480.00		467,490.00		476,492.00		495,140.00		591,900.00		408,830.00
Lock Walls—												
Excavation, 175,000 cu. yds. @	.55	96,250.00	.40	70,000.00	.23	40,250.00	.43	75,250.00	.30	52,500.00	.19	33,250.00
Excavated material placed by derrick, 5,000 cu. yds. @	.90	4,500.00	1.00	5,000.00	.50	2,500.00	.60	3,000.00	.50	2,500.00	.40	2,000.00
Dredging channel, 5,000 cu. yds. @	.20	1,000.00	.40	2,000.00	.35	1,750.00	.40	2,000.00	.25	1,250.00	.16	800.00
Concrete, 74,000 cu. yds. @	4.40	325,600.00	4.75	351,500.00	5.64	417,360.00	5.75	425,500.00	7.31	540,940.00	4.37	323,380.00
Granite for quoins, 328 cu. yds. @	60.00	19,680.00	80.00	26,240.00	67.00	21,976.00	75.00	24,600.00	50.00	16,400.00	60.00	19,680.00
Cast steel for quoins, 116,740 lbs. @	.09	10,506.60	.07	8,171.80	.12	14,008.80	.07	8,171.80	.10	11,674.00	.16	18,678.40
Steel culvert, 72", 1,500 lin. ft. @	18.00	27,000.00	20.00	30,000.00	15.51	23,265.00	15.00	22,500.00	15.00	22,500.00	15.65	23,475.00
Steel culvert, inlet, 30", 100 lin. ft. @	10.00	1,000.00	12.50	1,250.00	6.67	667.00	8.00	800.00	7.00	700.00	8.65	865.00
Steel culvert branches, 18", 200 lin. ft. @	5.50	1,100.00	7.00	1,400.00	6.62	1,324.00	8.00	1,600.00	5.00	1,000.00	6.65	1,330.00
Steel pump well pipes, 30", 97 lin. ft. @	10.00	970.00	12.50	1,212.50	6.67	646.99	8.00	776.00	7.00	679.00	8.65	839.05
Steel drain pipe, 18", 56 lin. ft. @	5.50	308.00	7.00	392.00	6.27	351.12	8.00	448.00	5.00	280.00	6.65	372.40
Steel I-beams and channels, 45,700 lbs. @	.05	2,285.00	.07	3,199.00	.03¼	1,599.50	.05	2,285.00	.05	2,285.00	.05	2,285.00
Wrought iron or steel lap-welded cable pipes, 13,500 lbs. @	.08	1,080.00	.12	1,620.00	.09	1,215.00	.10	1,350.00	.05	675.00	.10	1,350.00
Cast steel bases, 10 bases, @	85.00	850.00	125.00	1,350.00	93.00	930.00	200.00	2,000.00	102.40	1,024.00	100.00	1,000.00
Wrought steel I-bars, 40 bars, @	35.00	1,400.00	30.00	1,200.00	43.75	1,750.00	75.00	3,000.00	58.40	2,336.00	65.20	2,608.00
Wrought steel anchorage bolts, 9,600 lbs. @	.08	576.00	.08	768.00	.07½	720.00	.10	960.00	.08	768.00	.05	480.00
Mooring posts, 6 posts, @	.06	360.00	50.00	300.00	58.75	352.50	100.00	600.00	46.00	276.00	40.00	240.00
Mooring cleats, 20 cleats, @	30.00	600.00	25.00	500.00	18.65	373.00	25.00	500.00	30.00	600.00	25.00	500.00
Grand Total with Granite Quoins		$972,039.00		$965,321.50		$993,522.11		$1,062,309.00		$1,238,613.00		$823,304.45
Grand Total with Steel Quoins		967,865.60		947,253.30		985,554.91		1,045,880.80		1,238,887.00		822,302.85

Goodall Rubber Co., Inc., 704 Arch St., Philadelphia, Pa.	781.00
B. F. Goodrich Co. Akron, O.	423.50
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Double Service Packing Co., Inc., 430 Walnut St., Philadelphia Pa.	414.00
Garlock Packing Co., 136 Liberty St., New York	792.00
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New Jersey Asbestos Co., 52 Dey St., New York	387.00
Revere Rubber Co. 59 Reade St., New York	420.00
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Strong Mach. & Supply Co., 48 Franklin St., New York	414.00
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Crandall Packing Co., 136 Liberty St., New York	100.00
Double Service Packing Co., Inc., 430 Walnut St., Philadelphia, Pa.	138.00
Garlock Packing Co., 136 Liberty St., New York	264.00
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National Electrical Supply Co., Washington, D. C.	148.00
New Jersey Asbestos Co., 52 Dey St., New York	132.00
Revere Rubber Co., 59 Reade St., New York	100.00
William G. Stevenson, 110 Race St., New York	90.00
Strong Mach. & Supply Co., 48 Franklin St., New York	134.00
Mechanical Rubber Co., Cleveland O.	120.00
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Charles Bond Co., 520 Arch St., Philadelphia, Pa	$ 510.76
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Double Service Packing Co., Inc., 430 Walnut St., Philadelphia, Pa.	533.36
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National Electrical Supply Co., Washington, D. C.	578.56
New Jersey Asbestos Co., 52 Dey St., New York	542.40
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Strong Mach. & Supply Co., 48 Franklin St., New York	551.40
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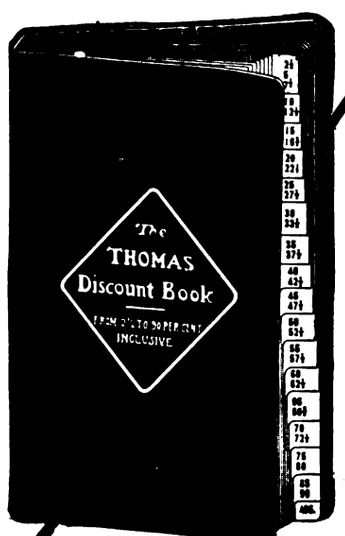

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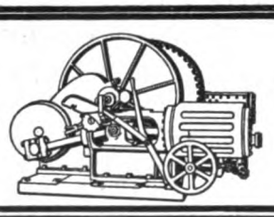
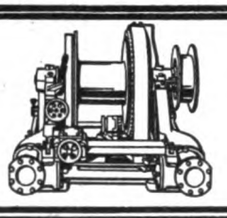
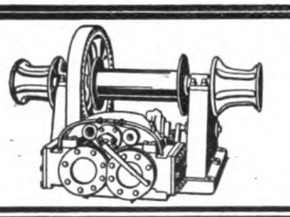

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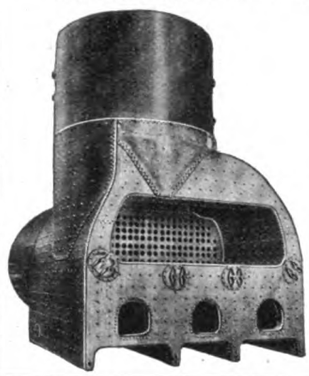

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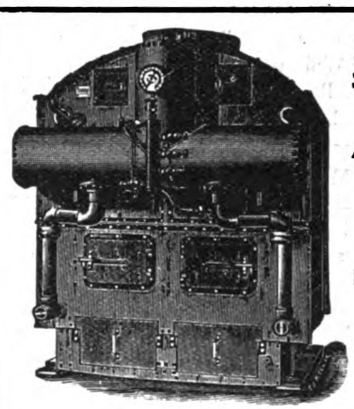

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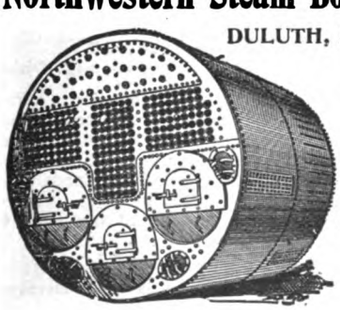

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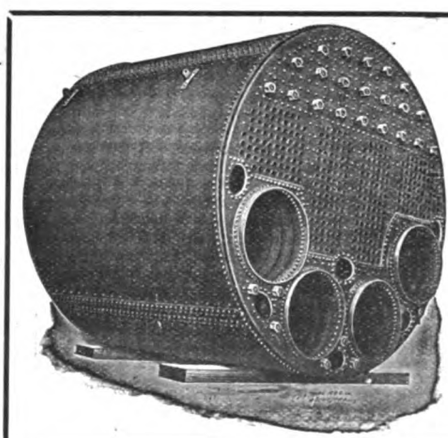

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PROPOSALS.

U. S. Engineer Office, Milwaukee, Wis., March 20, 1908. Sealed proposals for building pile pier, removing old pier, and dredging at Waukegan Harbor, Ill., will be received here until 2 p. m., April 20, 1908, and then publicly opened. Information furnished on application. W. V. Judson, Major Engrs.

U. S. Engineer Office, Duluth, Minn., March 6, 1908. Sealed proposals for dredging and hire of dredging plant at Superior Entry, Wis., will be received here until noon Monday, April 6, 1908, and then publicly opened. Information on application. Graham D. Fitch, Major, Engrs.

U. S. Engineer Office, Jones building, Detroit, Mich., March 17, 1908. Sealed proposals for dredging Hay Lake and Neebish Channels, St. Mary's River, Mich., will be received at this office until 3 p. m. April 17, 1908. Information furnished on application. C. McD. Townsend, Lt. Col. Engrs.

U. S. Engineer Office, Duluth, Minn., March 10, 1908. Sealed proposals for furnishing steel plate at Superior, Wis., will be received here until noon, April 9, 1908, and then publicly opened. Information on application. Graham D. Fitch, Major Engrs.

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